TECHNOLOGY DEPARTMENT

IN TWO SECTIONS—SECTION ONE

THE PAPER INDUSTRY and PAPER WORLD

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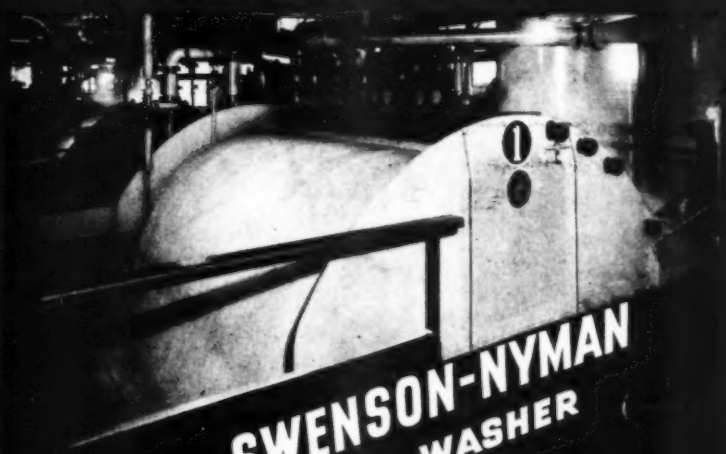
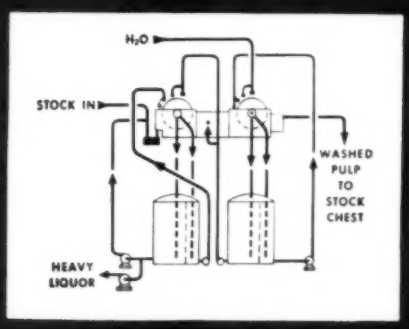


SWENSON-NYMAN PULP WASHER



SWENSON

SWENSON EVAPORATOR COMPANY

DIVISION OF WHITING CORPORATION
15653 Lathrop Ave. Harvey, Illinois
Eastern Sales Office and Export Department:
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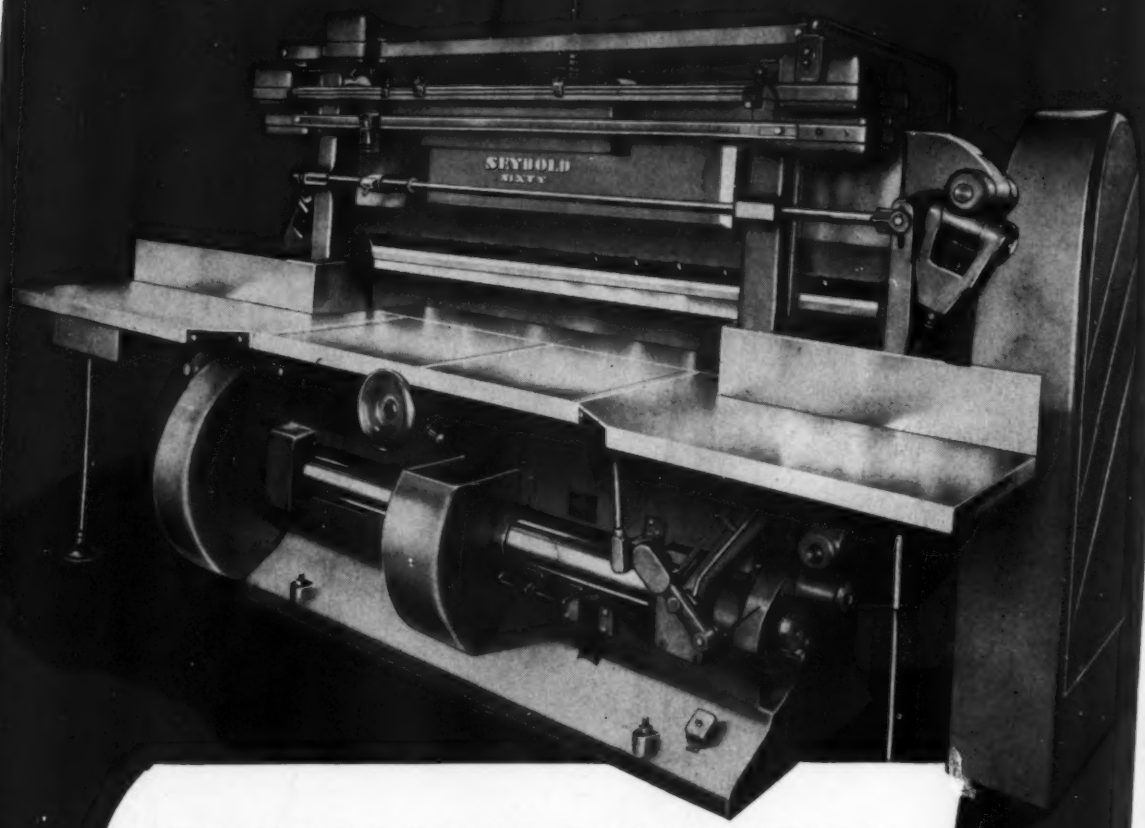
In Canada: Whiting Corporation (Canada) Ltd.
47-49 Laplante Ave., Toronto 2

✓R v.31 April - Sept. 1949



INCREASED MACHINE TONNAGE may not necessarily mean that you must increase the number of trimmers in your finishing room to keep production in balance. Some mills are learning this: *With new Seybold "Sixty" Spacer-Trimmers on the job, actually fewer trimmers are needed to handle more work! And valuable floor space is saved, too.* It will pay you to investigate production records being established by Seybold "Sixty" Mill Spacer-Trimmers.

HARRIS-SEYBOLD

General Offices—Cleveland 5, Ohio

Tech

Kimberly-Clark: creped wadding and facial

Although its mills are located primarily in the North and Canada, the Kimberly-Clark Corporation added a southern producer to its string with the purchase of the above plant at Memphis, Tennessee, in 1947. In that year it started up the first creped wadding machine to manufacture the trade-name product of Kleenex in the South. A second machine was added in 1948. Both are Beloit 174" Yankee Fourdriniers, incorporating newest and most efficient design features.—*Beloit Iron Works, Beloit, Wisconsin.*

WHEN YOU BUY BELOIT...YOU BUY MORE THAN A MACHINE!

BELOIT

PAPER MACHINERY

St. Regis Paper Company Reports on 1948

SUMMARY OF CONSOLIDATED INCOME
FOR THE YEARS ENDED DECEMBER 31, 1948 & 1947

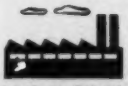
	1948	1947
Net Sales, Royalties, and Rentals	$162,672,925.94	$143,864,583.30
Cost of Sales and Expenses	138,402,144.86	120,445,637.30
Operating Income	24,270,781.08	23,418,946.00
Income Credits	1,146,500.80	1,343,654.32
Gross Income	25,417,281.88	24,762,600.32
Income Charges	1,457,579.52	678,458.53
Net Income Before Provision for Federal and Foreign Income Taxes	23,959,702.36	24,084,141.79
Provisions for Federal and Foreign Income Taxes	9,042,499.64	9,325,458.19
Net Income Before Deduction of Minority Interests	14,917,202.72	14,758,683.60
Deduct equity of minority holders of subsidiary's common stock in income	57,400.15	127,358.11
Net Income	14,859,802.57	14,631,325.49

Dividends Paid: Preferred Stock $ 828,208
Common Stock 4,136,571

Provisions for depreciation and depletion charged against income amounted to $4,568,416 for 1948, and $3,576,403 for 1947.

QUICK FACTS ABOUT ST. REGIS

1,850,000 ACRES OF TIMBERLAND



MILLS & PLANTS IN 30 LOCATIONS

ASSETS OVER 157,000,000

OVER 13,000 EMPLOYEES

OVER 17,000 STOCKHOLDERS

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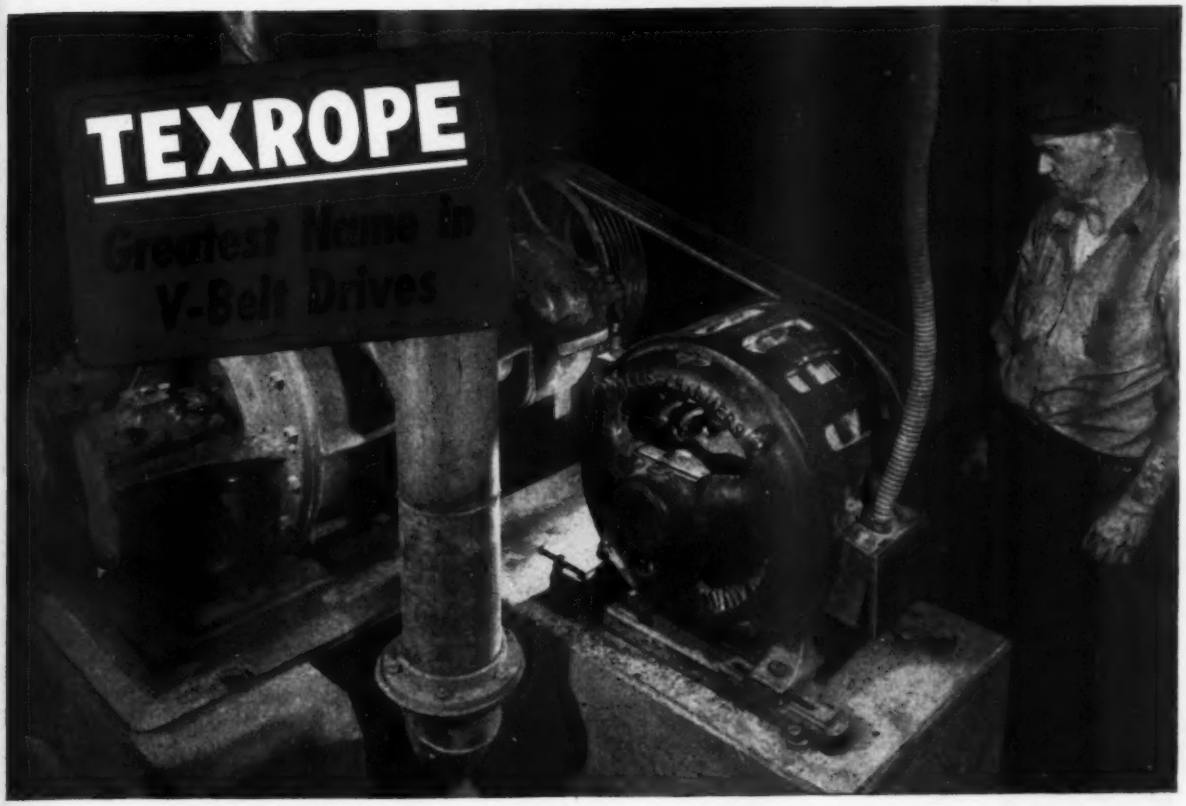

"No Upkeep Now"

BELT SLIP ELIMINATED, BEARING DAMAGE STOPPED, POWER WASTE ENDED WHEN *TEXROPE* V-BELT DRIVE REPLACES FLAT BELT.

CHIEF PLANT ENGINEER in this midwest plant says, "The old flat belt on this blower drive was twelve inches wide on twenty foot centers. Not only was it heavy but it also absorbed a lot of power.

"Besides that, dust made the belt slip constantly. We had to keep the belt so tight that it ruined bearings. And slipping would burn the belt. Maintenance on our old flat belt drive cost us hundreds of dollars every year.

"Four years ago an Allis-Chalmers representative recommended this *Texrope* drive. It doesn't slip at all, doesn't hurt the bearings and we haven't spent a cent on it. I wish we had changed to a *Texrope* drive years sooner."

Money-saving performance like this is one of the reasons why more *Texrope* industrial V-belt drives have been installed since 1926 — when Allis-Chalmers originated the multiple V-belt drive — than any other kind.

The *Texrope* line gives you practically everything you need for any V-belt drive . . . V-belts, standard and *Vari-Pitch* sheaves and speed changers . . . all from one reliable source. You can engineer 90% of all V-belt drives yourself with the help of the *Texrope* Pre-engineered Drive Manual. See your A-C Authorized Dealer or District Office or write for Bulletin 20B6956. Also in Sweet's.

Texrope Super-7 V-belts result from the cooperative research of Allis-Chalmers and B. F. Goodrich; and are sold only by A-C dealers and offices. *Texrope* and *Vari-Pitch* are Allis-Chalmers trademarks. A 2648

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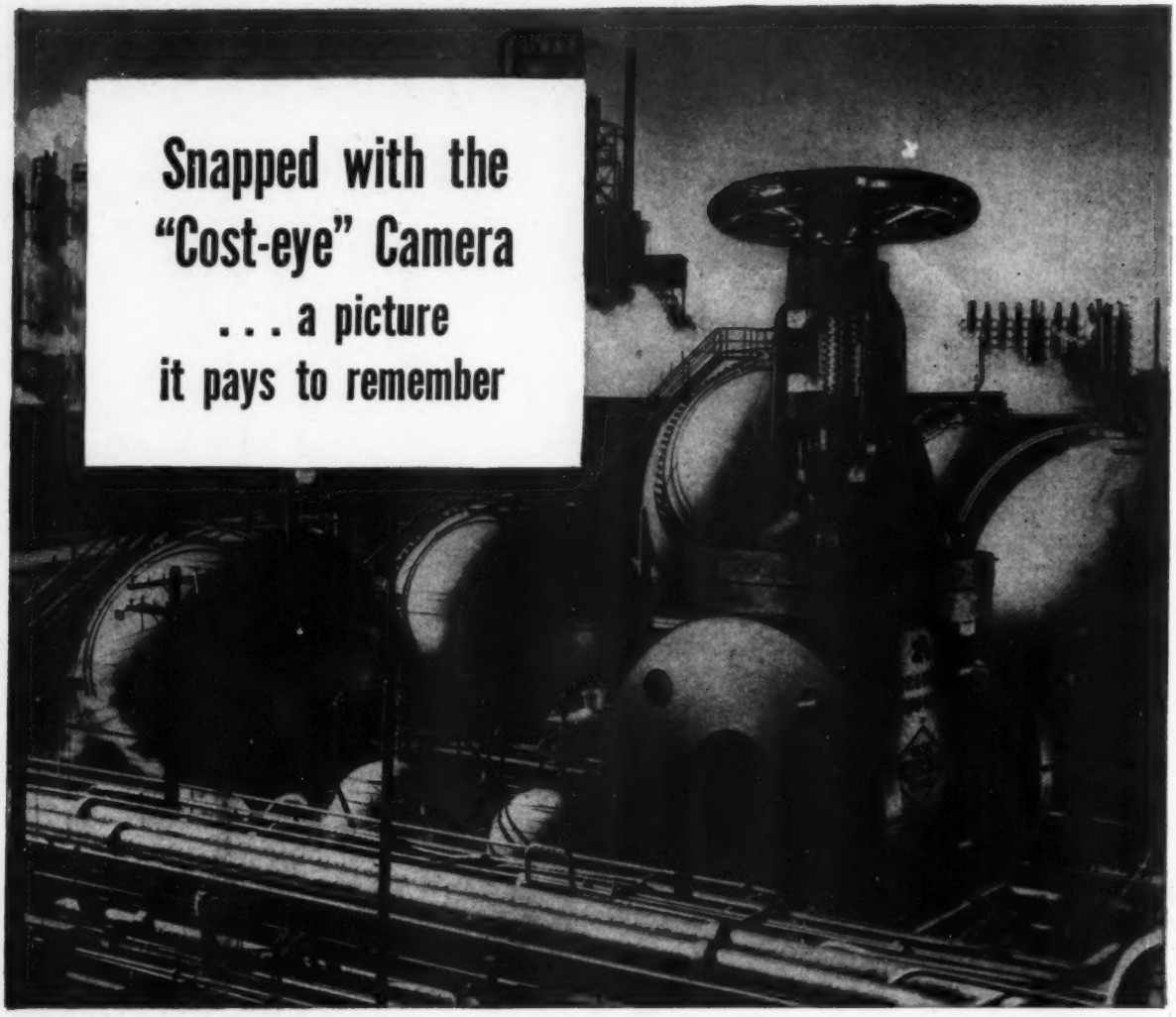
ALLIS-CHALMERS



IF A CAMERA could be constructed with an eye to costs, this is the picture you'd get of a synthetic rubber plant. By showing *all valves* as *one valve* it brings into proper perspective the valve investment in *any* plant, *any* large building where operation involves fluid control. Collectively, valves represent a major expenditure . . . yet too often, they are selected with "petty cash" consideration.

IT WILL PAY MANAGEMENT to keep this picture in mind. With wages and material costs the highest ever, valve maintenance costs must be watched as carefully as operating expense of larger plant units.

EXCESSIVE MAINTENANCE of one inferior valve is insignificant, but multiplied by thousands, it is a serious drain on operating budgets.

JENKINS BROS. helps you meet this problem two ways. First, by building extra endurance into Jenkins Valves, making them the longest-lasting, lowest-upkeep valves that money can buy. Second, with advice from Jenkins Engineers on any question of proper selection, installation, inspection or maintenance.

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"PREVENT VALVE FAILURE" is a 28-page guide to valve economy, fully illustrated, with case histories of valve damage, and recommendations for its prevention by proper selection, installation, inspection, and maintenance. FREE on request. Write: JENKINS BROS., 80 White St., New York 13, N. Y.

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SINCE 1864

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(Reg. U. S. Pat. Off.)

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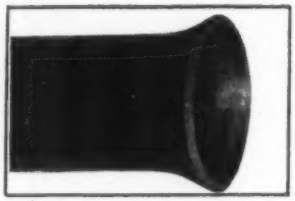
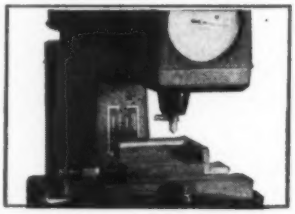
"TIMKEN® shows you what you get and guarantees you'll get it!

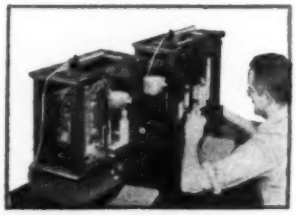


1. NO CRACKS OR FLAWS. *Tube sections must withstand expansion to 20% increased I.D. without showing flaws or cracking.*

2. PRESSURE TESTED. *Each tube must withstand hydrostatic pressure test of 1000 pounds per square inch before shipment.*



3. CONTROLLED HARDNESS. *Rockwell hardness test on a specimen must indicate a hardness number not exceeding B 89.*



4. CHEMICAL COMPOSITION: *C—.15 Max., Mn—.30 Max., P—.040 Max., S—.040 Max., Si.—10 Min., Ni—4.74-5.25.*

. . . that's why we specify TIMKEN® 5% nickel tubes," says large Louisiana paper mill company

Timken® specifications for 5% nickel tubes cover every essential point: chemical composition, physical properties, inspection methods, tolerances, and many others. And Timken 5% nickel tubes are *guaranteed* to meet these specifications. That's why a large Louisiana paper mill uses Timken 5% nickel tubing for black liquor evaporator service. They are *sure* of getting the tubing they pay for . . . and maximum tube life per dollar invested.

Timken 5% nickel tubing specifitations have been used by leading pulp mill operators for many years. By using Timken 5% nickel tubing made to these specifications, mill operators have been able to cut the cost of black liquor corrosion through less downtime, lower tube replacement costs, and longer tube sheet life. 4 examples of the Timken specifications are shown above.

If you want to eliminate guesswork when you buy your next evaporator tubes, write for your copy of Timken Specifications for 5% nickel tubes. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

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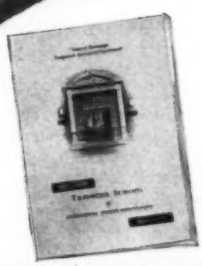

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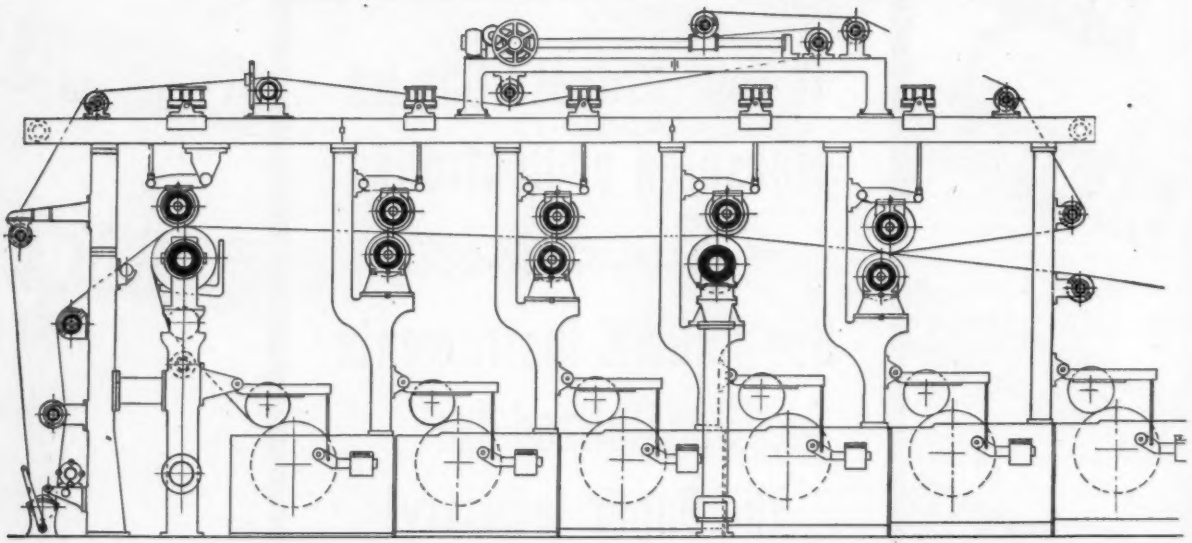
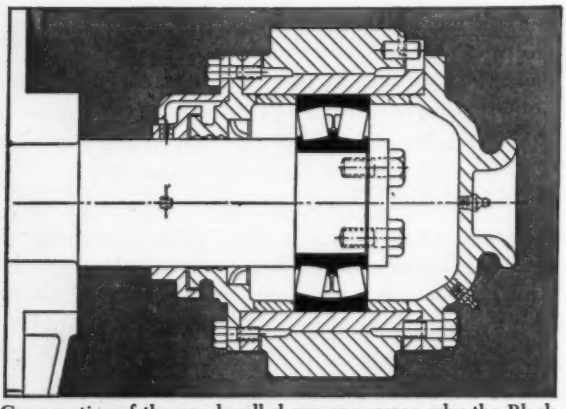
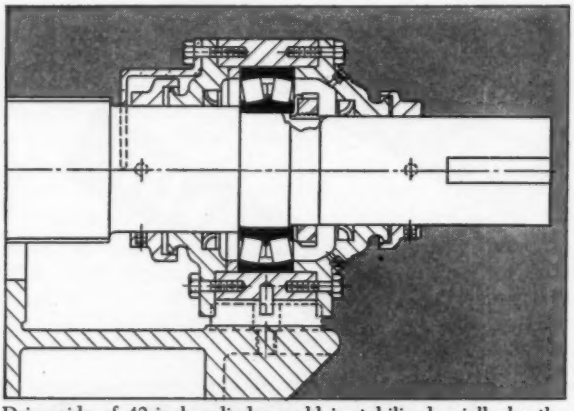
Black-Clawson specifies 183 Torrington Spherical Roller Bearings for new 154-inch Board Machine



Soon to be erected is the modern Black-Clawson 154-inch Board Machine shown here in elevation. Every roll visible—cylinder molds, couch rolls, upper and lower primary press rolls and wet felt rolls—will be equipped with Torrington Spherical Roller Bearings. Applications to parts of the machine not shown bring the total of Torrington Bearings specified to 183.



Cross-section of the couch roll shows one reason why the Black-Clawson Company specified Torrington Spherical Roller Bearings. Barrel-shaped rollers *align automatically* within outer race spherical bores. Result: getting proper alignment on paper machine frames is simple, despite 174-inch center distances.



Drive side of 42-inch cylinder mold is stabilized axially by the either-way thrust capacity of Spherical Roller Bearings. Full roller contact area is maintained under deflection or misalignment: free rotation is unimpaired. Long service life is secured with minimum maintenance attention.

To get smooth, reliable operation, long service life, low maintenance costs, specify Torrington Spherical Roller Bearings for *your* new equipment or replacements. Our engineers are always ready to work with you on your bearing requirements. Write us today. THE TORRINGTON COMPANY, South Bend 21, Ind., Torrington, Conn. District offices and distributors in principal cities.

TORRINGTON *SPHERICAL ROLLER* **BEARINGS**

Spherical Roller • Tapered Roller • Straight Roller

Needle • Ball • Needle Rollers

Laboratory illustration of good water treatment . . . and bad. Test rods, in same water, same temperature and circulation conditions, but only one with Nalco treatment added (left), show the improvement you can expect with The Nalco System.
—Nalco Laboratories Photo

Nalco

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- THE NEW NALCO SR SERIES OF PRODUCTS alleviate fire side deposits.

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WE CAN all agree that *good* water treatment should provide clean pipe lines from the raw water intake through all equipment and including condensate return lines. It should provide clean valves, cooling systems, turbines, and boiler and processing equipment free from scale, corrosion, slime and algae. Boilers should be maintained free from foam so that steam can be produced in a satisfactorily dry condition with blowdown kept at a minimum. Such a condition should be maintained on a permanent basis with a *good* system of water treatment.

This, briefly, is the Nalco idea of *good* water treatment. It is the kind of water treatment that is possible and has proven economical in thousands of plants now using The Nalco System.

For your own satisfaction, and at no obligation whatever, ask to have a Nalco field representative survey your plant so that you may decide for yourself the benefits The Nalco System has to offer.

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This is the kind of dependable, cost-lowering service you can get from *Electrifugal* pumps. Motor and pump are mounted on *one* shaft in *one solid frame* for maximum rigidity. Feet are wide spread for firm support. Bronze ring protects casing from wear by impeller and is easily replaced when required.

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PUMPS — Integral motor and coupled types. Sizes and ratings to 2500 GPM.

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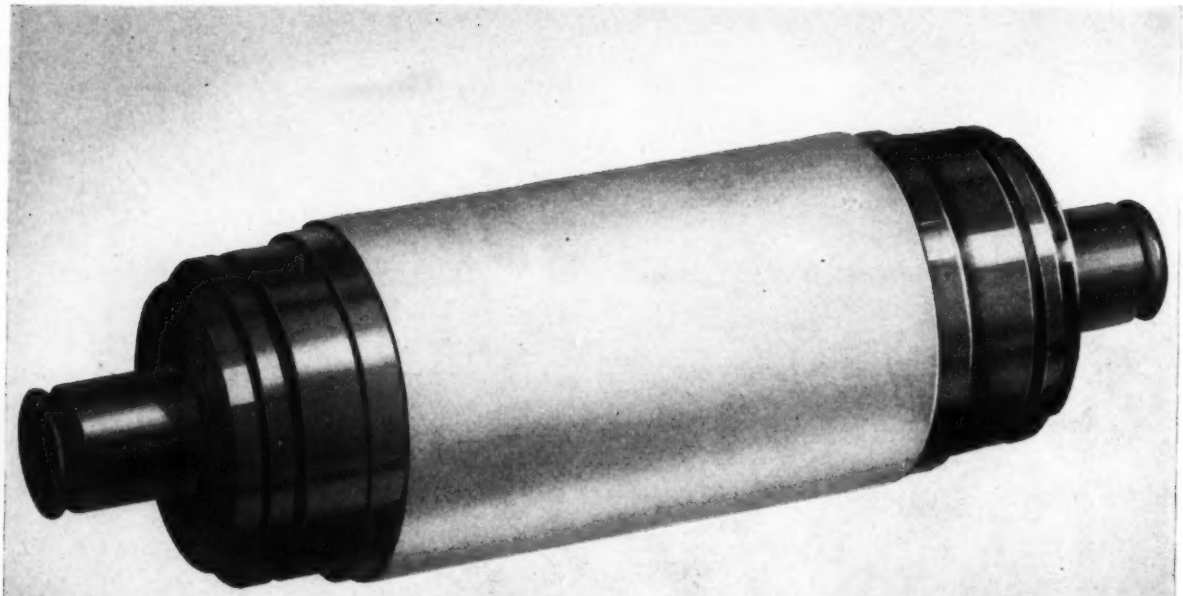
ALLIS-CHALMERS



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SUTHERLAND

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NORMA-
Field Offices: Ne

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The men and management of Weyerhaeuser Timber Company are keenly alive to the necessity of protecting forest lands from fire. Since 1903 the Weyerhaeuser organization has been participating in cooperative fire protection efforts with other private forest owners and with State and Federal agencies.

Supplementing its fire protection activities, the Weyerhaeuser forestry management program also includes relentless insect and disease control throughout its extensive timber tracts and the company's eight thriving Tree Farms which are producing harvests for the future.

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WEYERHAEUSER

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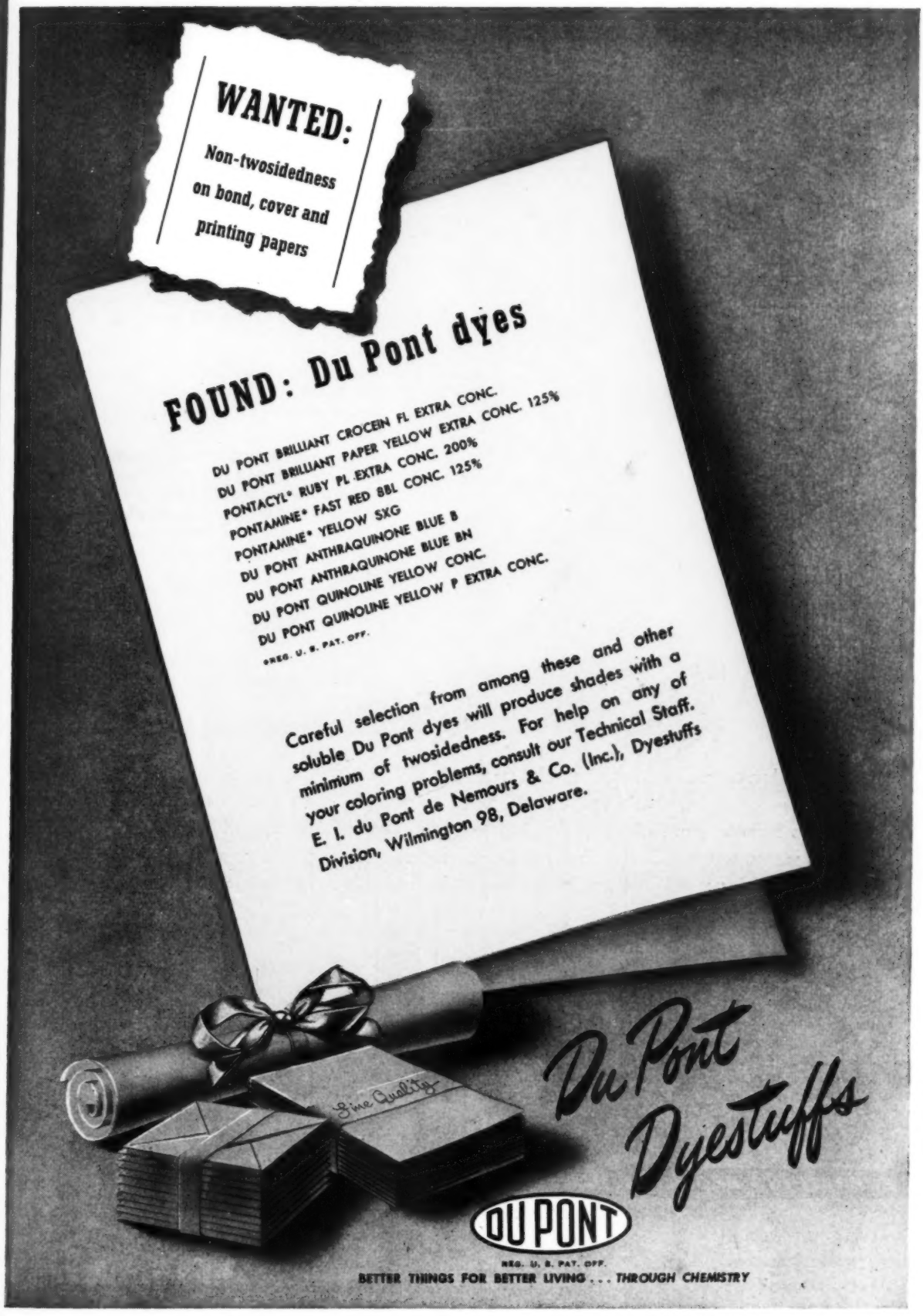
VALLEY IRON WORKS COMPANY • Appleton, Wis.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DU PONT BRILLIANT CROCEIN FL EXTRA CONC.
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PONTAMINE® FAST RED 8BL CONC. 125%
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DU PONT ANTHRAQUINONE BLUE B
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®REG. U. S. PAT. OFF.
Careful selection from among these and other soluble Du Pont dyes will produce shades with a minimum of twosidedness. For help on any of your coloring problems, consult our Technical Staff. E. I. du Pont de Nemours & Co. (Inc.), Dyestuffs Division, Wilmington 98, Delaware.
Fine Quality
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BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

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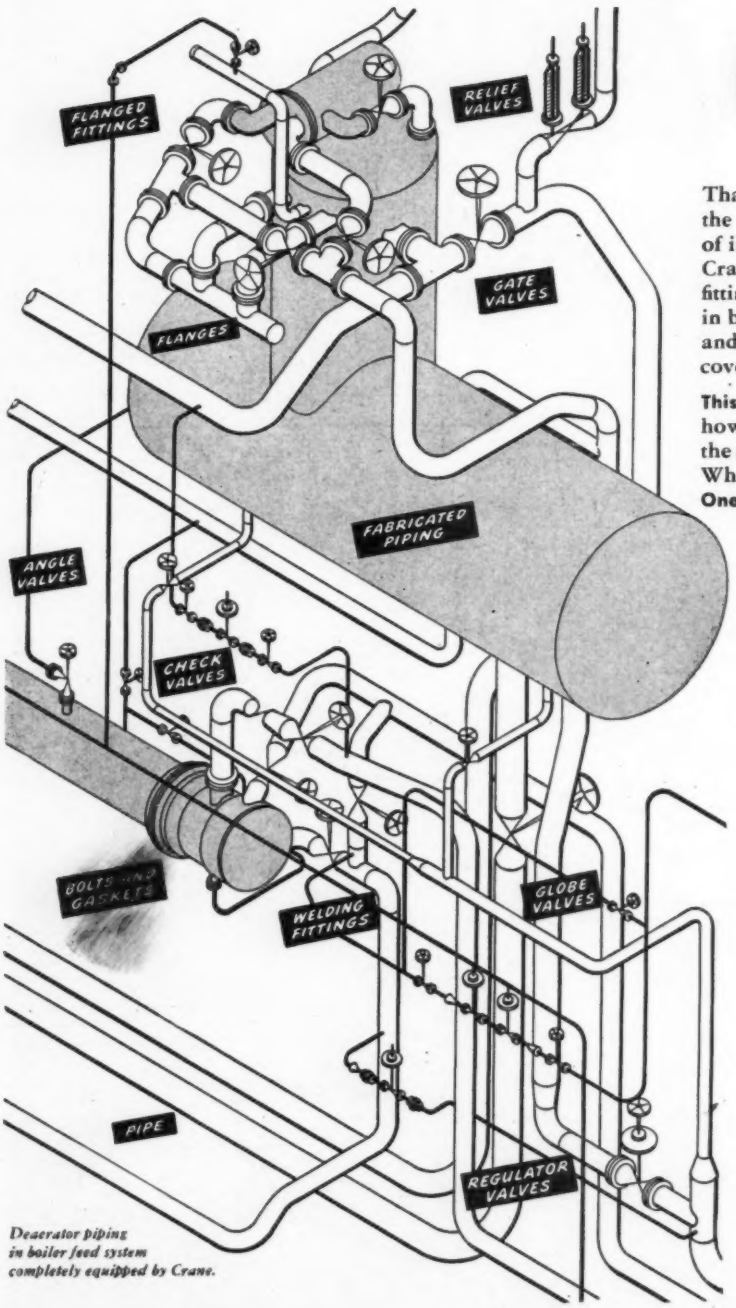
Everything in piping...for every need ...on one order to CRANE



Deaerator piping in boiler feed system completely equipped by Crane.

ONE SOURCE OF SUPPLY
RESPONSIBILITY
STANDARD OF QUALITY

That's the kind of service you get from Crane, the world's leading manufacturer and supplier of industrial piping equipment. "Everything" at Crane includes an unequalled selection of valves, fittings, fabricated piping, pipe and accessories—in brass, iron, steel and alloys. One catalog . . . and one order to your nearest Crane Branch cover whatever is needed for the job.

This Deaerator Piping, for example, illustrates how completely Crane supplies everything for the system, regardless of the fluids to be handled. When you standardize on Crane, you depend on **One Source of Supply** broad enough to simplify every piping procedure. You get better installations . . . avoid needless delays . . . by placing **Undivided Responsibility** on Crane for materials. And for **Highest Quality** in every piping item, specify Crane Quality—unsurpassed for more than 90 years.

CRANE CO., 836 S. Michigan Ave., Chicago 5, Ill.
Branches and Wholesalers Serving All Industrial Areas

***FOR TOUGH STEAM SERVICES** up to 750 deg. F., and for water, oil, air, gas and other non-lubricating liquids up to 500 deg. F., Crane recommends No. 47XR 150-pound Cast Steel Wedge Gate Valves. Designed for tight seating with long-lasting Exelloy to Nickel Alloy. Screwed, flanged or welding ends. Sizes: 2 in. and larger. See your Crane Catalog, p. 304.*

EVERYTHING FROM . . .

VALVES • FITTINGS
PIPE • PLUMBING
AND HEATING

CRANE

FOR EVERY PIPING SYSTEM

BWH
DEPENDABLE RUGGEDNESS
Bull Dog Industrial V-Belts are available in A, B, C, D and E sections, full range of lengths
Fractional Horsepower (FHP) V-Belts are available in three standard sections, full range of lengths

LESS SLIPPAGE! COOLER RUNNING! LONGER LASTING!

NO WONDER THERE'S INCREASING DEMAND FOR

RUGGED BULL DOG V-BELTS

On tough jobs where a dependable V-Belt drive is of utmost importance, operators today are specifying Bull Dog V-Belts.

These new BWH "titans" have consistently proved they deliver the kind of steady, trouble-free service that speeds production and slashes maintenance costs.

Here's why there's less slippage with Bull Dog V-Belts, fewer shutdowns for adjustments, greater long-term economy in their use:

1. *Exclusive Bull Dog Cord Section Has Higher Tensile Strength,* able to carry the load and absorb shock.

2. *Low Stretch,* because exclusive Bull Dog Cords are processed in a new way. As a result, there's less slippage, fewer adjustments, longer belt life.

3. *Cool Running,* thanks to quality-controlled compounds developed in BWH laboratories, which do not crack or deteriorate under the most severe flexing.

4. *Wear-Resistant Covers* of heavy, bias-cut fabric, to protect heart of belt from dirt, grease and moisture.

Bull Dog V-Belts are one of many famous products manufactured by BWH. When you need industrial rubber goods, look to BWH for products of dependable ruggedness, to BWH distributors for dependable service.

HAVE YOU A JOB WHERE STAMINA COUNTS?
Bring us your toughest problems. We're specialists in solving them. Consult your nearby BWH distributor or write us direct.

Another Quality Product of

BOSTON WOVEN HOSE & RUBBER COMPANY

Distributors in all principal cities

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THERE IS A

BETTER WAY

TO GRIND PRESS ROLLS

When a felt passes through the nip it adjusts itself to every curve and irregularity in the press rolls. If the rolls are uneven, the pressure will be uneven, too; more water will be squeezed from the high places than from the low places; felt life will be shortened and drying time will be increased.

Hamilton Felts will not grind your rolls for you, but, from the thinnest tissue to the heaviest board, there is a Hamilton Felt that will dry your sheets better, faster and at lower cost.

SHULER & BENNINGHOFEN, HAMILTON, OHIO

• Miami Woolen Mills •

Hamilton Felts

• Established 1858 •

IF YOU HAVE CORROSION PROBLEMS THESE BOOKS SHOULD BE ON YOUR DESK

They Cover Durco's Complete Line of Corrosion-Resisting Alloys and Equipment

Bulletin 100 — Lists 155 corrosives in alphabetical order and shows which of the five outstanding Durco alloys offers most satisfactory resistance to each corrosive. Gives the nominal composition and the physical, mechanical and special characteristics of each alloy, as well as an indication of its relative cost.

Catalog K — The encyclopedia of Durco corrosive-handling equipment. Describes 36 types of Durco products including pumps, pipe, valves, heat exchangers and other acid-handling equipment. Gives the features of each type, also sizes, capacities, and the Durco alloys in which it is made.

To get your free copies of both of these bulletins, simply fill out the coupon and put it in the mail.

DURCO
CORROSION RESISTING ALLOYS & EQUIPMENT

THE DURIRON CO., INC.
DAYTON 1, OHIO
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THE DURIRON CO., INC., DAYTON 1, OHIO

Please send me, without cost or obligation, copies of your Catalog K and Bulletin 100.

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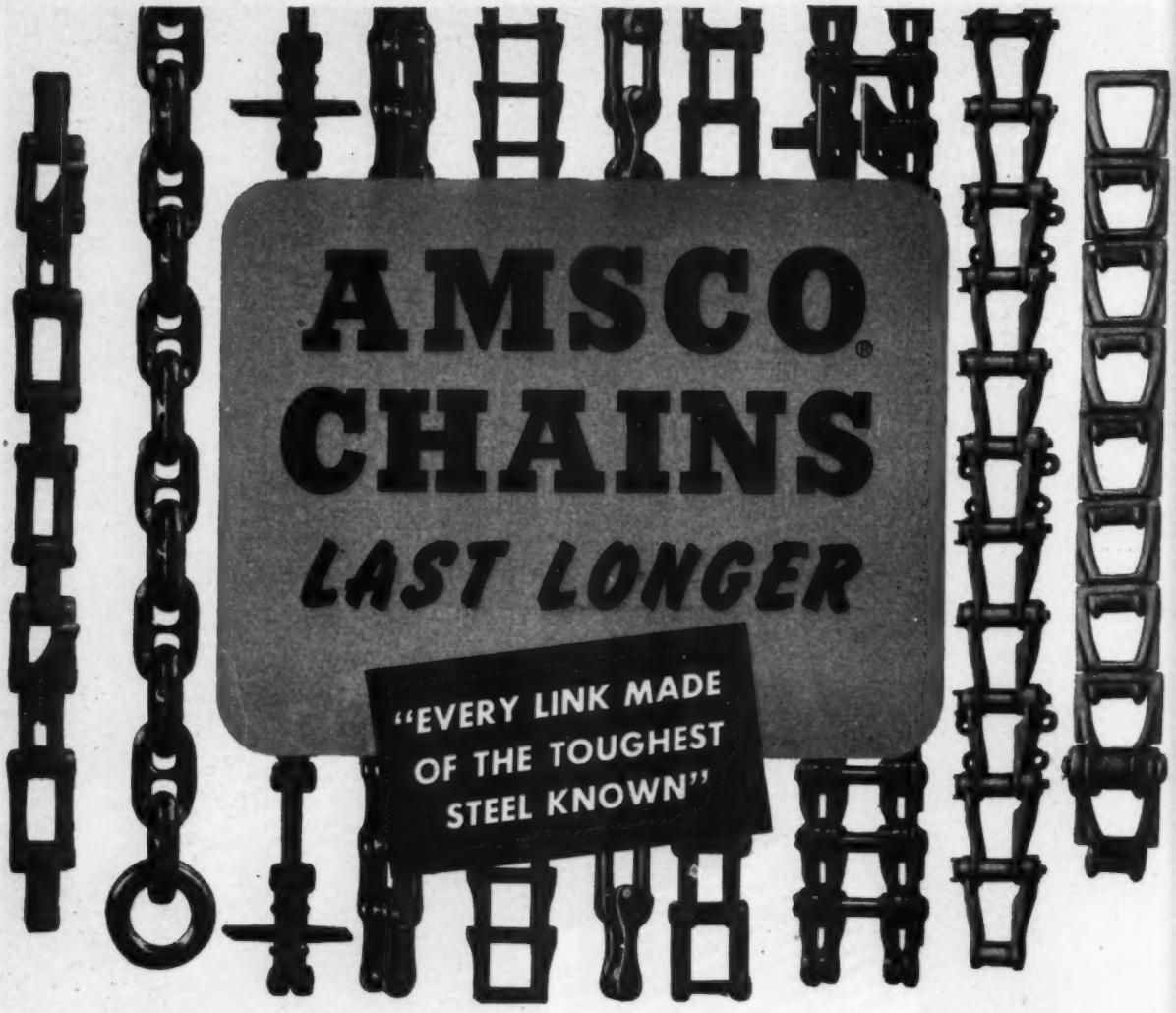
DURCO Adv. 76-GM



Replacing ordinary elevating and conveying chain is a constant drain on profits . . . a constant source of production tie-ups and delays. Stop all these worries today by installing Amsco manganese steel chain in the really tough services. It often repays its own cost many times over by its tough resistance to breakage stresses and its outstanding wear resistance.

Here's the kind of service users report: 25 months with little wear versus 8 months; 27 months with 2 years' service left where ordinary chain lasted only 3 months.

With a test-bar tensile strength of 125,000 lbs. (average test), high ductility, and a surface that work hardens to as high as 550 Brinell, Amsco manganese steel chain withstands severest stresses and grinding abrasion . . . it can be used without lubrication in dust-laden atmospheres.

Added to this is the Amsco engineering design experience that will help to meet your problem with the one best chain for trouble-free service. Write for Bulletin 742-CN . . . and let us quote on your requirements.

AMERICAN Brake Shoe COMPANY

AMERICAN MANGANESE STEEL DIVISION
CHICAGO HEIGHTS, ILL.

Foundries at Chicago Heights, Ill., New Castle, Del., Denver, Colo., Oakland, Calif., Los Angeles, Calif., St. Louis, Mo.
Offices in principal cities. In Canada: Joliette Steel Limited, Joliette, Que.

50 YEARS OF SERVICE

BASIC CHEMICALS

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FOR AMERICAN INDUSTRY

ACIDS
ALUMS
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It takes scores of steady customers to keep a company climbing through the business peaks and valleys of 50 years. Satisfying them means providing a lot of service of the right kind at the right time.

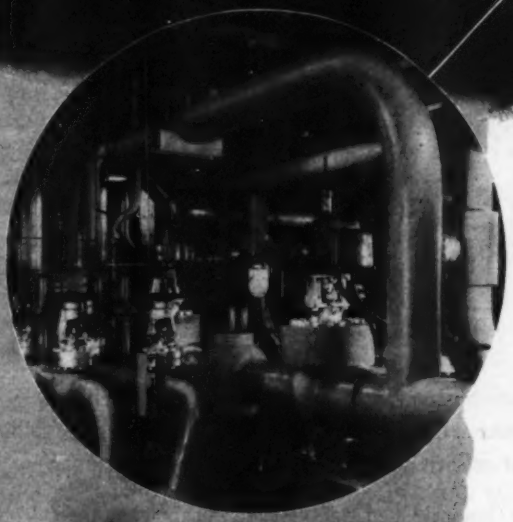
In 1899, the founders of General Chemical believed in this when they combined a dozen small companies into one well-knit organization. Today, that concept of General Chemical service has resulted in more than 90 producing and distributing facilities in centers of commerce from coast to coast.

In research, engineering, production, and in sales, everything is done that can be done to serve you well. Remember this when you specify General Chemical—first for Basic Chemicals for American Industry.

GENERAL CHEMICAL DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.
OFFICES IN PRINCIPAL CITIES FROM COAST TO COAST

Planning A New Power Plant

... or an addition to an existing one?



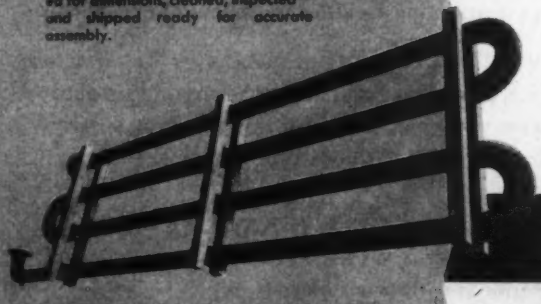
At P. P. & E. sub-assemblies are shop fabricated under ideal conditions, stress-relieved, pressure-tested, checked for dimensions, cleaned, inspected — and shipped ready for accurate assembly.

For Greatest Efficiency--Turn the *Complete* Piping Job Over to P.P.& E.

Shop fabrication and field erection by Pittsburgh Piping and Equipment Company can relieve you of many responsibilities and assure a piping system that is superior in reliability and economy of operation. Our service begins with the blueprint and ends only when the system is installed.

Materials are selected on the basis of conditions to be met; sub-assemblies are expertly shop fabricated in a modern plant with complete facilities for assembling and testing; field erection is done by skilled and experienced craftsmen.

When you place the complete job in the hands of P.P.& E. — you utilize to the utmost extent the advanced technique that we have developed during almost half a century of producing piping systems for the world's greatest power plants. Consult our nearest representative for further information.



Pittsburgh Piping

AND EQUIPMENT COMPANY

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Your costs come down with DISSTON

ONE-MAN CHAIN SAW

Powered by the Mercury Gasoline Engine

Make the modern move to the Disston One-Man Chain Saw. Watch production soar and costs come down. In mere minutes this saw does the felling, bucking and limbing that used to burn up costly hours.

The Disston One-Man Chain Saw is dependable—light to handle and husky—has long life, anti-friction bearings and positive lubrication. Easily started in any weather. Easily, safely controlled, even when cutting at awkward angles and upside down! Never has modern power taken such a big bite out of the cost of cutting timber and lumber. A demonstration proves it.

Get in touch with your nearest Disston Dealer.
Or write direct for full information.

NEW DISSTON ONE-MAN BOW SAW FOR ADDED USES

No more pinch, drag and strain in the cut. Available as a complete unit (Price $432)—or as an extra useful accessory (Price $55 including chain). Quickly interchangeable with Disston One-Man Guide Rails, anytime —anywhere.

ALSO...The best value for bigger timber . . . The DISSTON EXTRA-DUTY TWO-MAN CHAIN SAW

This 12 hp. husky does tough jobs double-quick. The right saw for heavy work. Pivoted blade swings 360°—for handy cutting at all angles.

MAIL COUPON TODAY

HENRY DISSTON & SONS, INC.
464 Tacony, Philadelphia 35, Pa.

Gentlemen: Please send me full information on the:

- ☐ DISSTON ONE-MAN CHAIN SAW
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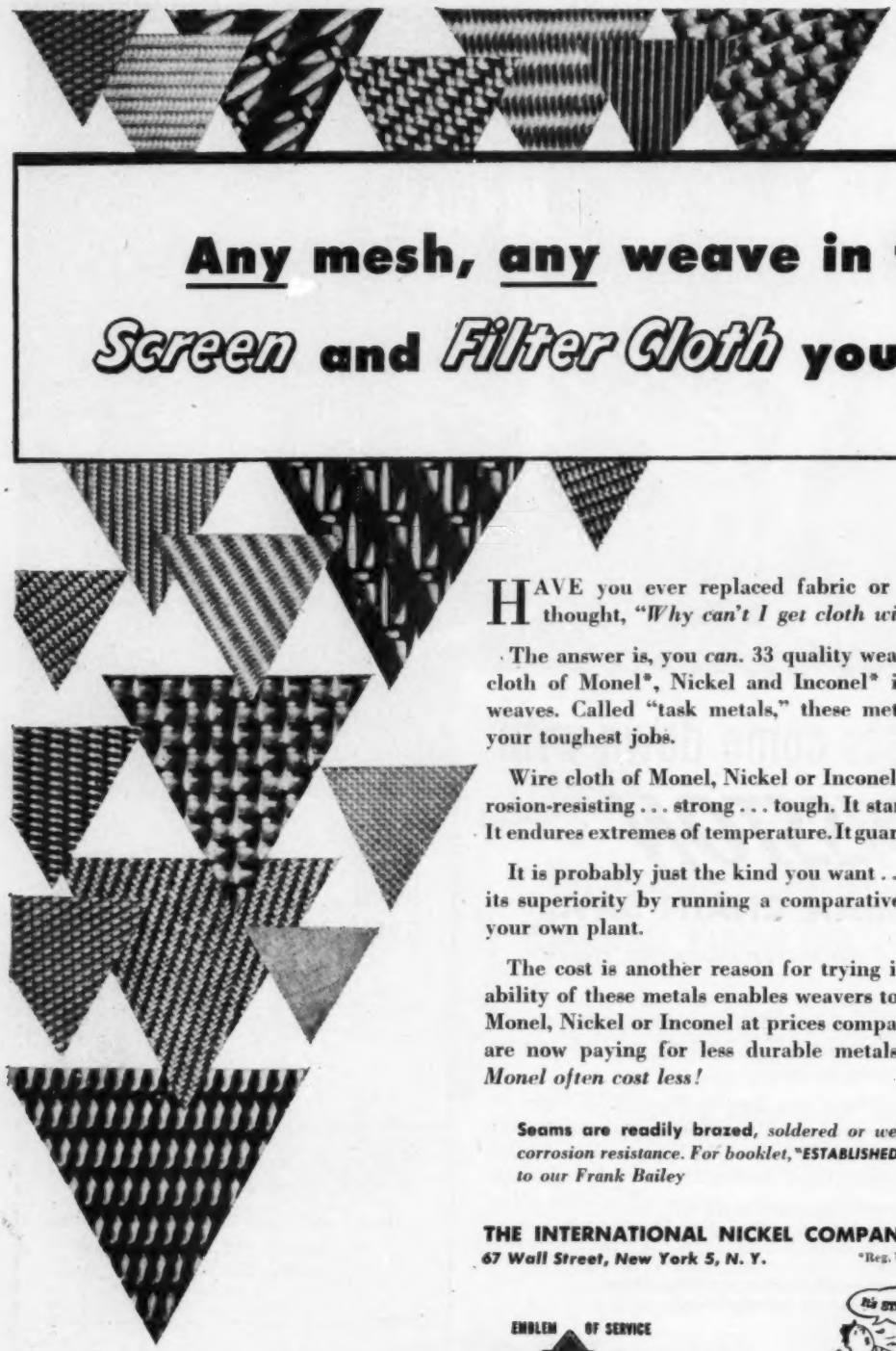
WHEN YOU BUY A DISSTON PRODUCT YOU BUY DISSTON STEEL SKILL and SERVICE



Any mesh, any weave in the Screen and Filter Cloth you need!

HAVE you ever replaced fabric or metal cloth, and thought, *"Why can't I get cloth with better life?"*

The answer is, you *can*. 33 quality weavers produce wire cloth of Monel*, Nickel and Inconel* in all meshes and weaves. Called "task metals," these metals are ready for your toughest jobs.

Wire cloth of Monel, Nickel or Inconel is rustless . . . corrosion-resisting . . . strong . . . tough. It stands abrasive wear. It endures extremes of temperature. It guards product purity.

It is probably just the kind you want . . . and *need*. Prove its superiority by running a comparative-life test right in your own plant.

The cost is another reason for trying it. The easy workability of these metals enables weavers to produce cloth of Monel, Nickel or Inconel at prices comparable to what you are now paying for less durable metals. *Fine weaves of Monel often cost less!*

Seams are readily brazed, *soldered or welded; retain full corrosion resistance. For booklet,* **"ESTABLISHED WEAVERS,"** *write to our Frank Bailey*

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street, New York 5, N. Y.

*Reg. U. S. Pat. Off.

EMBLEM OF SERVICE
INCO
TRADE MARK

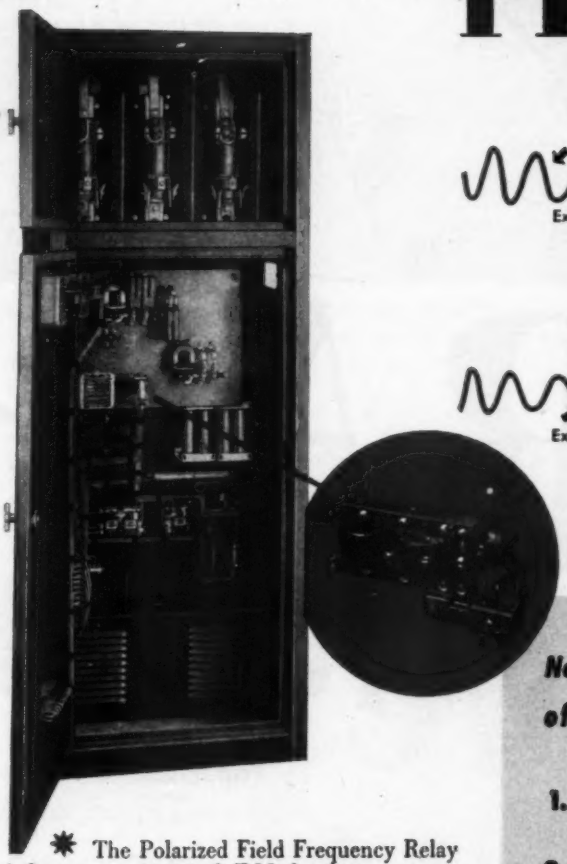
Monel* Nickel Inconel*

"Task Metals" for Industry

HERE'S HOW YOU GET

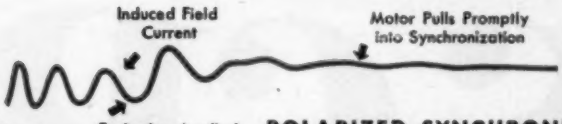
Perfect Motor Synchronizing

WITH **PFFR** *



INCORRECT SYNCHRONIZING

Excitation applied at unfavorable point, with resulting high surges of current and reversals of torque before synchronizing.



POLARIZED SYNCHRONIZING

Excitation applied at point that gives best synchronizing, with minimum current and maximum torque.

* The Polarized Field Frequency Relay Control System, an original E-M development perfected over many years, still continues to be accepted by the most competent engineers as the best control on the market. The reasons are that this system is continuously sensitive to motor speed and rotor position . . . applies excitation at just the right instant for the smoothest, most powerful synchronization on starting . . . provides for prompt resynchronization should the motor pull out of step from voltage dips or overloads. No other method can do these things . . . provide this simple, correct and wholly reliable method of synchronization. Polarized Field Frequency Relay is a key part of the Motor Control E-M has developed.

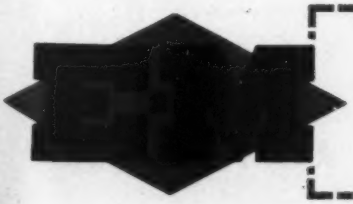
ELECTRIC MACHINERY MFG. CO.
MINNEAPOLIS 13, MINNESOTA

***Noteworthy are these other advantages of* E-M MOTOR CONTROL**

★ ★ ★

1. **Short circuit protection—with current-limiting and power fuses.**
2. **Motor isolating disconnects—fuses that can be swung open.**
3. **Complete motor protection—coordinated, pre-engineered control.**
4. **Safety for operators—metal enclosed units.**
5. **Adaptability for group lineup—sturdy, attractive, free standing and easily installed units.**

Call on your E-M field engineers for full details or write to us today for Bulletin 192.



SYNCHRONOUS MOTOR CONTROL

COMPLETE PROTECTION • CORRECT SYNCHRONIZING

3100-TPA-2076

It's your SCRAP for more Steel!

CASE STUDY NO. 1:

88 Carloads

Here's a photographic equipment manufacturer with a systematic metal-salvage program. No more scrap, they said. Yet, after more careful study, they found 88 carloads of heavy iron and steel scrap in a 30-day period!

CASE STUDY NO. 2:

Metalworking Plant Surprised!

This big fabricator reported all scrap being turned in. When told needed scrap includes old equipment, not just "production" scrap, they uncovered extra tons of iron and steel.

CASE STUDY NO. 3:

Paper Converter Delivers!

This plant replaced 3000 obsolete machines with new ones. Held old ones for occasional spare parts. Changed mind, scrapped 2800, reduced inventory, got high price for scrap.

You, too, may have heavy iron and steel scrap you don't know about. It's the *heavy* scrap that makes the best steel and by processing faster, increases steel output. Appoint one top official of your company to find it. Today, it's dead inventory. Tomorrow, it can be money in the bank. But better than that, it can help to build the one million tons of reserve scrap that we need to increase production for domestic use and for security purposes. Remember—scrap reserves are low, the price of steel scrap is high. Help America and yourself by putting your scrap back to work.

Space contributed by

THE PAPER INDUSTRY AND PAPER WORLD

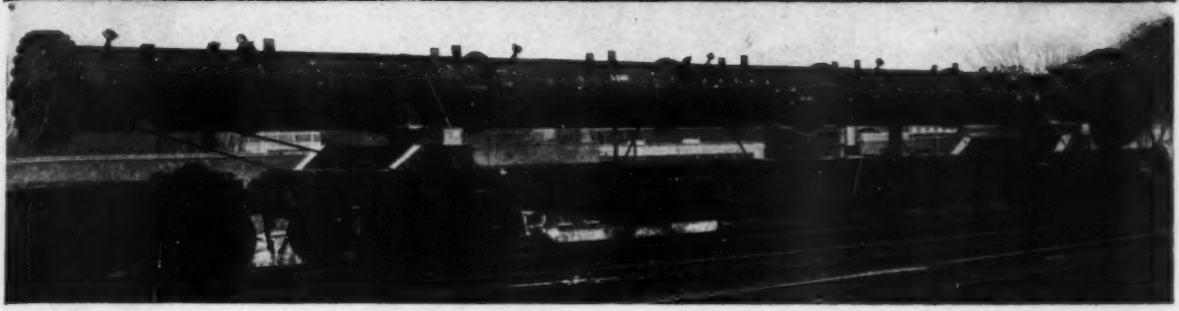
VESSEL DIVISION

NEWS

A. O. SMITH Corporation

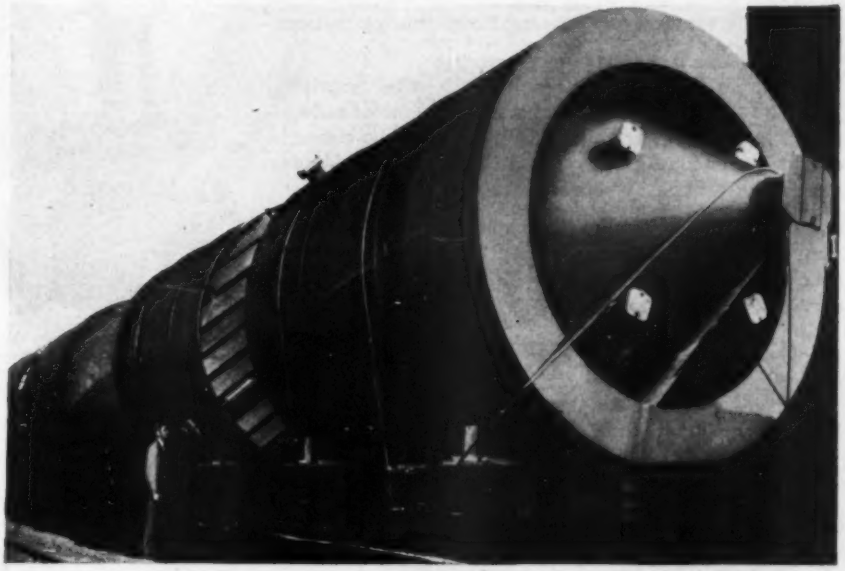
75th ANNIVERSARY 1874 - 1949

New York 17 • Philadelphia 5 • Pittsburgh 19 • Atlanta 3 • Chicago 4
Tulsa 3 • Dallas 1 • Houston 2 • Seattle 1 • Los Angeles 14
International Division: Milwaukee 1

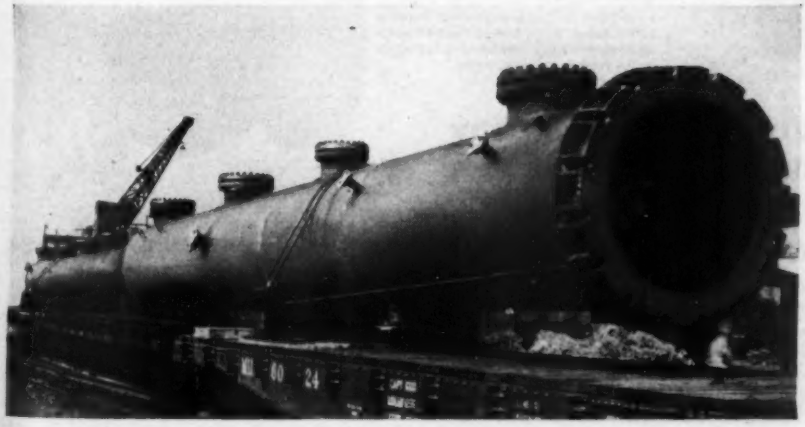


INTO EVERY SMITHlined FAT-SPLITTING TOWER, like the above 68-ft.-long SMITHway Tower, goes the experience and knowledge gained from a long and extensive program of research and development into the corrosion problems of the Fatty Acid Industry.

THREADING A NEEDLE. Getting a 12 ft. dia. by 43 ft. long paper mill replacement digester into an existing building is a difficult feat. A. O. Smith did it by shipping the SMITHlined Digesters *in sections* for final assembly and welding in place inside the paper mill.



A. O. SMITH MAKES ALL TYPES OF OIL-REFINING PRESSURE VESSELS. Here is one type, a SMITHlined Absorber Tower three railroad cars long (approximately 107 ft. long), leaving for a refinery in Ohio.



NEW BULLETINS

Write the nearest A. O. Smith office listed at the top of this page for these new A. O. Smith Bulletins:

FIELD ASSEMBLY OF PRESSURE VESSELS — Bulletin V-44.

SMITHway VESSELS, Alloy, Alloy-Lined, Clad, and Glass-Lined—Bulletin V-46.

It takes POWELL VALVES *to*

complete your production picture

Fig. 375—200-pound Bronze Gate Valve with screwed ends, inside screw rising stem, union bonnet and renewable wear-resisting "Powellium" nickel-bronze disc.

Everyone knows that in putting together a jig-saw puzzle picture it's simply a matter of putting the right piece in the right place.

In the case of flow control equipment the principle is the same. Because, only by installing the right valve—in design and material—to meet all the requirements of a specific service, can failures due to misapplication be eliminated.

Fortunately Powell *has been* applying this principle for more than a century. The result is a line of valves which is so complete that, for any set of flow control conditions encountered today, there's a Powell Valve that exactly fits all requirements.

So why not let Powell Engineers help you to complete your production picture by selecting valves that are specifically designed for your individual flow control services. Write us for details.

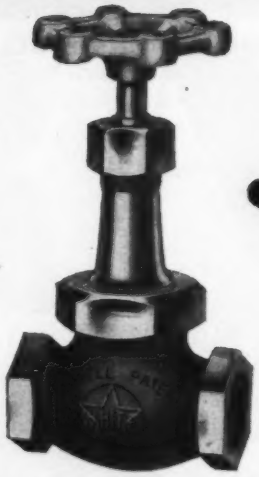


Fig. 1708—200-pound Bronze Globe Valve with screwed ends, union bonnet, renewable, specially heat treated stainless steel seat and regrindable, renewable wear-resisting "Powellium" nickel-bronze disc.

Fig. 560—200-pound Bronze Regrinding Horizontal Swing Check Valve with screwed ends, screwed-on cap and regrindable, renewable bronze disc.

Fig. 500—125-pound Bronze Gate Valve with screwed ends, screwed-in bonnet, inside screw rising stem and tapered solid wedge in sizes ¼" to ¾", inclusive; double wedge in sizes 1" to 3", inclusive.

Fig. 1793—Large 125-pound Iron Body Bronze Mounted Gate Valve. Made in sizes 2" to 30", inclusive. Has outside screw rising stem, bolted flanged yoke and tapered solid wedge. Also available in All Iron for process lines.

The Wm. Powell Company

Cincinnati 22, Ohio

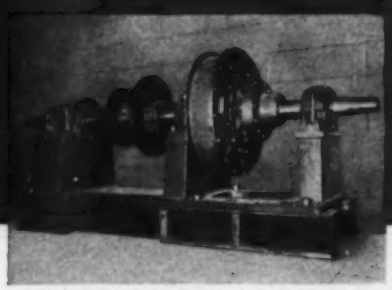
DISTRIBUTORS AND STOCKS IN ALL PRINCIPAL CITIES

POWELL VALVES

FAWICK-EQUIPPED MACHINES

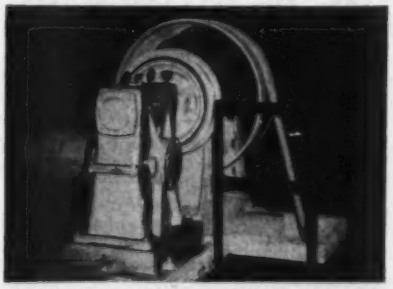
do More Work at Less Cost

Fawick Air-Ring Clutch or Brake Type E



Fawick Airflex element used on No. 3 Paper Machine Dryer Drive at Hammermill Paper Co., Erie, Pa.

Fawick Airflex element used on Pusey and Jones Corporation Dryer Drive at Marcalus Mfg. Co., East Paterson, N. J.



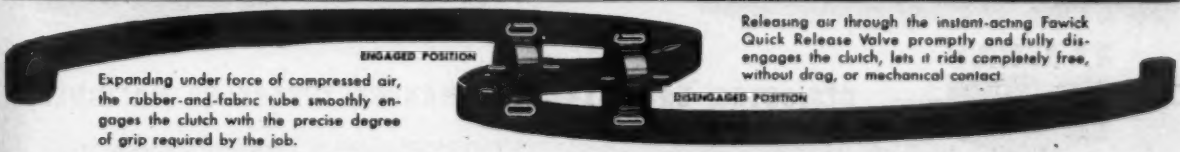
Fawick Airflex Clutch on Calendar Drive of No. 2 Paper Machine at Howard Smith Paper Co., Ltd., Cornwall, Ontario.

Time-wasting clutch adjustment down time is practically eliminated on Fawick-equipped machines. The moving parts of this Fawick Clutch—the rubber-and-fabric pneumatic tube and the friction shoe assemblies—adjust automatically and compensate for wear.

The smooth engagement action of this Fawick Clutch eliminates sudden shock loads which damage machinery. Controlled torque starting can be obtained with a simple modulating air valve. This type Fawick Clutch is ideally suited to continuous slip applications.

For specific recommendations for your machines, write to our Engineering Department today. Address Dept. PI.

FAWICK Airflex CO., INC.



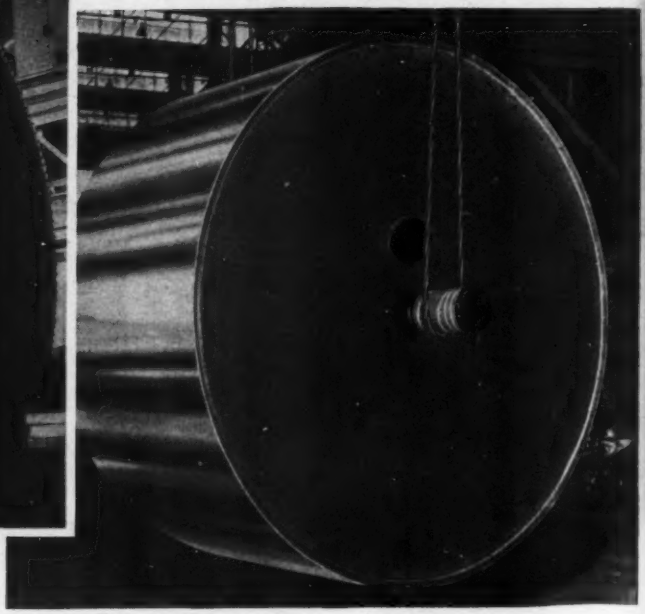
Expanding under force of compressed air, the rubber-and-fabric tube smoothly engages the clutch with the precise degree of grip required by the job.

Releasing air through the instant-acting Fawick Quick Release Valve promptly and fully disengages the clutch, lets it ride completely free, without drag, or mechanical contact.

Another LUKENWELD Drier Roll ON ITS WAY TO CHAMPION...

The seventh Lukenweld Drier Roll to go into this important service at Champion Paper and Fibre Company; shipped November, 1948. It is 12 feet in diameter, with an 8'4" face.

The first of these Lukenweld Drier Rolls was shipped to Champion, 12 years ago.



for a further boost in Kromekote* production

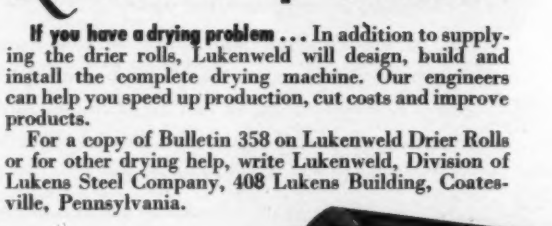
Kromekote's superb printing properties depend upon the uniformity and perfection of this paper's coating. A Lukenweld Drier Roll helped Champion develop the revolutionary methods which gave Kromekote those properties way back in 1937. Six additional Lukenweld Drier Rolls have since been added to take care of the ever-increasing demand.

Repeat orders received regularly from the various industries in which Lukenweld Drier Rolls are working —paper, chemical, drug, food, plastic and other industries—are evidence of their worth. Their welded steel plate construction is strong and dependable; high pressures are employed with safety. Simple in construction, there's nothing to get out of order.

Where Lukenweld Drier Rolls have replaced other rolls, production increases of 18% to 35% have been reported. This is accounted for by the positive removal of condensate and higher steam velocities obtained. Heat is transferred to roll faces rapidly and uniformly.

If you have a drying problem ... In addition to supplying the drier rolls, Lukenweld will design, build and install the complete drying machine. Our engineers can help you speed up production, cut costs and improve products.

For a copy of Bulletin 358 on Lukenweld Drier Rolls or for other drying help, write Lukenweld, Division of Lukens Steel Company, 408 Lukens Building, Coatesville, Pennsylvania.



Patents applied for

*T. M. Reg. U. S. Pat. Off. for Champion's Cast Coated Paper

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Can you hang this sign on your turbines?

Could the oil in your turbines today be left there for the next 10 or 15 or 20 years without removal for treating, resting, or cleaning the oil system? Yes, if it were Nonpareil Turbine Oil. For instance, take Nonpareil's operating record in the midwest utility plant shown above.

Nonpareil was put into three 5,000 KW General Electric turbines in July 1932, November 1934, and November 1940, respectively. The first fills of Nonpareil have never been removed from the three turbines. In 16 years' operation in one unit, Nonpareil maintained an average neutralization number of .06 mg. KOH/gm. Because of low-acidity operation, there has been no need for treating oil or cleaning turbine oil systems.

Why risk dangerous acidity increase that can lead to the formation of harmful deposits and emulsions in turbine oil? Make your next fill Nonpareil Turbine Oil. It contains anti-corrosion and anti-foaming agents further to assure safe operation for the "life of your turbine."

Ask a Standard Oil Lubrication Engineer about the benefits of the written guarantee you receive with Nonpareil. Write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

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STANDARD OIL COMPANY (INDIANA) STANDARD

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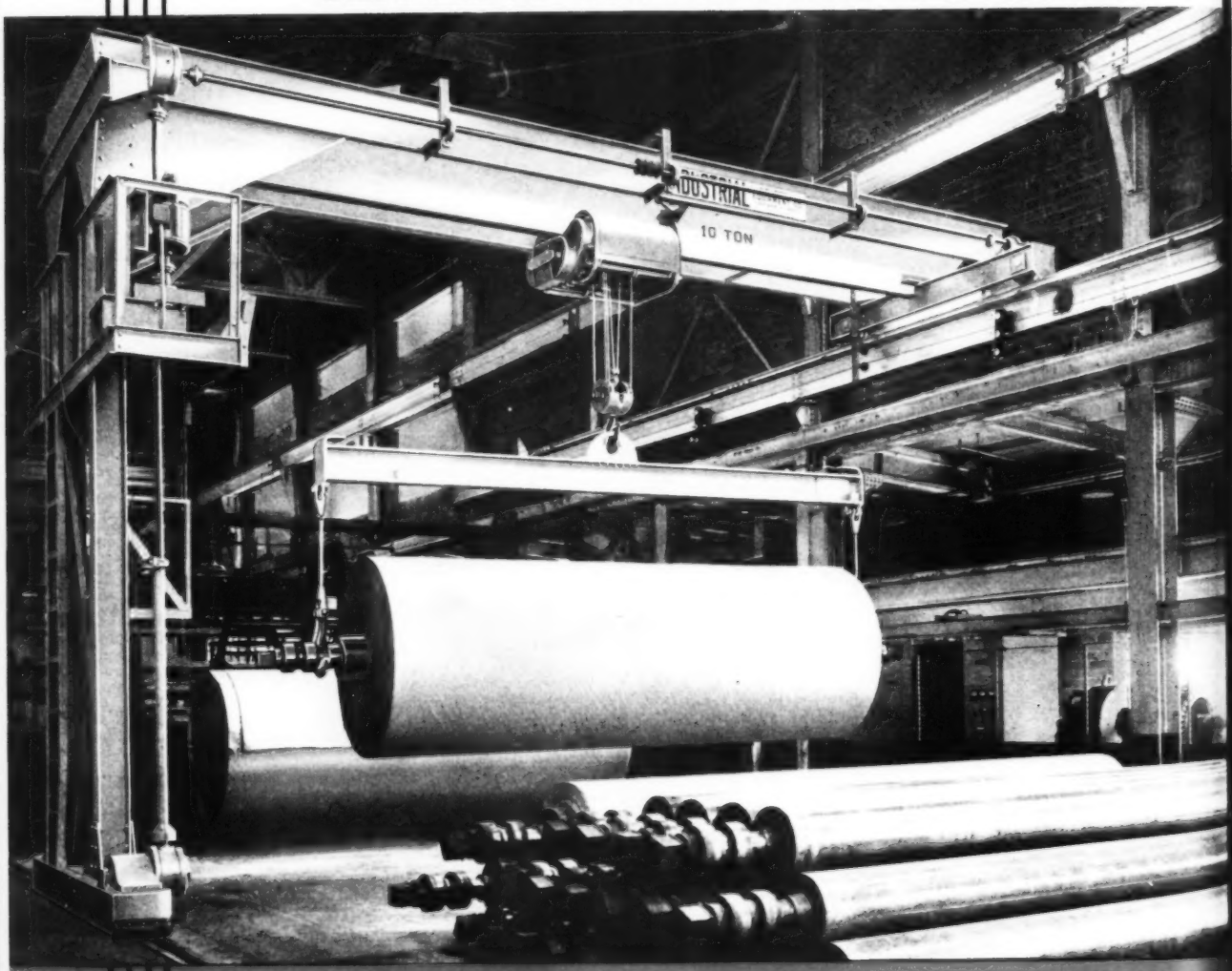

Also builders of all types of overhead cranes, jib cranes, twin hook cranes and monorail systems.

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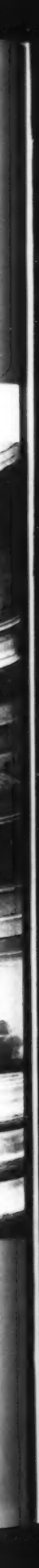


Editorial

The Benign "Dis-inflation"

▶▶▶ THE FIRST QUARTER of 1949 is on record, examination of which shows that the over-all economy of the country has been undergoing a benign recession. "The total output of goods and services and the flow in income from their production were running at a high rate," so says the report of the Department of Commerce.

The readjusments to the operation of the law of demand and supply, which became apparent during the fourth quarter of 1948, continued. The maladjustment of the war period had to be corrected. It was inevitable. And, now that it has been in vogue for more than six months, we can view the realignment with confident assurance that over-all business is on a sounder basis. There was some slackening of consumer expenditure as shown by the trend of retail sales, but the compensation for that has been the maintenance of high income and wholesome decline in the cost of living, which augments the buying power in the hands of the consumer.

The readjustments in some segments of industry were rather drastic, but after they were made, the readjusted ones returned to a better, normal operation. The paper industry has emerged from the readjustment period with a particularly strong basic position.

The factors that are contributing to keep it in such position are first, the continued amazing increase in population and the downward trend of domestic production in the postwar years of 1946, 1947 and 1948.

The census of 1940 gave us a population of 131.7 millions. The Census Bureau now states that in 1948 we had 147,946,000—an increase of 16,246,000.

In 1949, our population doubtless will be 150.5 millions, a total increase for this decade of 18.7 million—more than double the increase in the 1930 to 1940 decade of 8.9 millions.

Surely, when the prizes are handed out, the first prize for production should be pinned upon Mr. and Mrs. America.

It is their production which is causing the economy of the country to bulge at the seams. For this vital upsurge expands every segment of every enterprise in the country. Its continuance insures the progress of bigger, better business.

Particularly is this so for the paper business, whose products are the essential commodities in the nation and whose per capita consumption is at an all-time high. The postwar trend of domestic production of paper products is significant—In 1946, production was 1.9 million tons over 1945. In 1947, it was 1.7 tons over 1946. In 1948, it showed barely 1 million tons over 1947. In the same years, the population increased 8 millions in round numbers.

So, the outlook at this time presages a tightening of balance between the demand and supply relation in paper products.

Over-all business is engaged in balancing its budget. It is a prime time to do it, for volume is high; employment never was higher nor so well paid as in this year; the number of consumers never showed such rapid increase. Confidence in our political administration still has its fingers crossed, but is showing a tendency to wait and see.

Then, barring an unseen emergency, the operations of this country's economy should be large and again profitable.

A benign recession is never fatal.

An Enlarged Safety Program

▶▶▶ SAFETY will receive henceforth the combined earnest efforts of the American Paper and Pulp Association and The American Pulp and Paper Mill Superintendents Association operating through a Joint Safety Committee which will co-operate with the National Safety Council (See item this issue under Safety).

That safety pays dividends is proved by the records of both large and small plants in this industry that have been carrying on organized safety work and competing with their own previous performances for more than twenty years. The monetary savings directly attributable to such programs have been augmented by avoiding such indirect losses as property damage, production slowdowns, and time lost by workers other than the injured.

Reports to the National Safety Council of 1947 accident experience from 6600 plants in all industries showed average frequency and severity rates of 13.26 and 1.23 respectively. Of these, 376 units in the paper and pulp manufacturing group had an average frequency of 18.32 and severity of 1.39. This industry ranked 28th in the total list of 40 reporting. Twelve industries had frequency rates lower than ten.

Proof that progress does result from continuous, organized accident prevention effort is indicated by a reduction of approximately 30 per cent in average frequency in identical plants of this industry reporting to the Council in the years 1932 to 1947.

The 25th Annual Paper Industry Safety Contest now in progress had an average frequency rate of 11.49 at the end of eight months through February, 1949. This was 22 per cent lower than the same period of last year (identical contestants). Of the 326 total contestants, 157 had frequency rates below 10, and 31 of them had completed eight months without a lost-time accident. This is further proof that accidents are reduced most effectively through the help of complete and organized safety programs.

Records of the U. S. Bureau of Labor show that 1414 plants in this industry reported their accidents to the Bureau in 1946. Their average frequency rate was 24.2. Assuming that a large majority of them were doing little, if anything, to lower accident frequency and severity rates, it is probable that succeeding years will show better results following cooperative efforts of the Joint Safety Committee that has just been formed.

LongLac Pulp Mill Rounds Out Integrated Operation of Kimberly-Clark Corp.

▸▸▸ ONE HUNDRED and twenty-five years ago, a party of explorers made history when the boundary line between Canada and the United States was surveyed. These historians paddled canoes between the Slate Islands and the mainland in Lake Superior, only a few miles from Terrace Bay, Ontario.

Another chapter was written when, the first of this year, Kimberly-Clark's affiliated organization, the Long-Lac Pulp and Paper Company, Ltd., planned to bring into production a 300-ton bleached sulphate pulp mill. This event climaxed the expansion program carried out by Kimberly-Clark on both sides of the international border.

Even greater than the completion of the new mill is the industrial victory achieved by the men behind this great project—a victory considered phenomenal in these times—*this new $23,000,000 pulp mill went into production a month and a half ahead of schedule.*

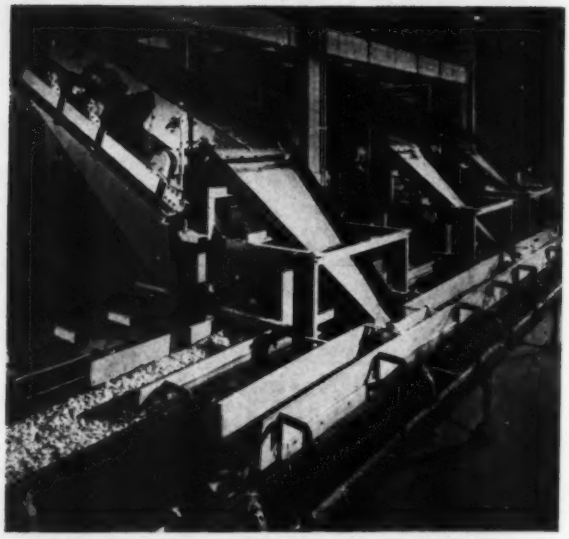
Much has been written—and there is enough color left to paint a book of prose—about the Slate Islands, which now belong to Kimberly-Clark and for a number of years have supplied pulpwood to its operations; and about the Aguasabon River, where in the summer of 1948 a power plant was completed which now furnishes power for LongLac and other mills on the north shore of Lake Superior.

Here, for your information and ready reference, we give you some briefed technical data on this new plant. The accompanying illustrations will augment the summary, and we hope will leave you with the feeling that you have made a "flying" trip to the LongLac mill.

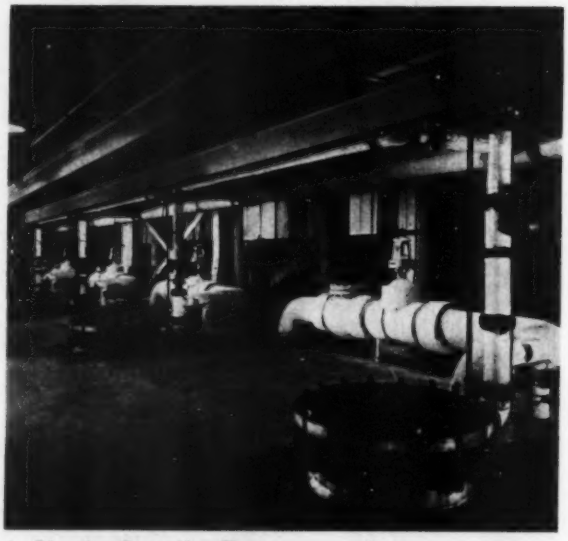
▸▸▸ FOUR YEARS BEFORE Pearl Harbor, it was announced that arrangements for the construction of a 100-ton-mill at Terrace Bay, Ontario, had been completed between the Ontario government and a company called LongLac Pulp and Paper Company (cf. *Paper World,* Dec., 1941).

Then came the great war, and it was not until December, 1945, that plans to build the mill and townsite were outlined by Cola G. Parker, president of the Kimberly-Clark Corporation, with which the LongLac company is affiliated (cf. P. I. AND P. W., Dec., 1945).

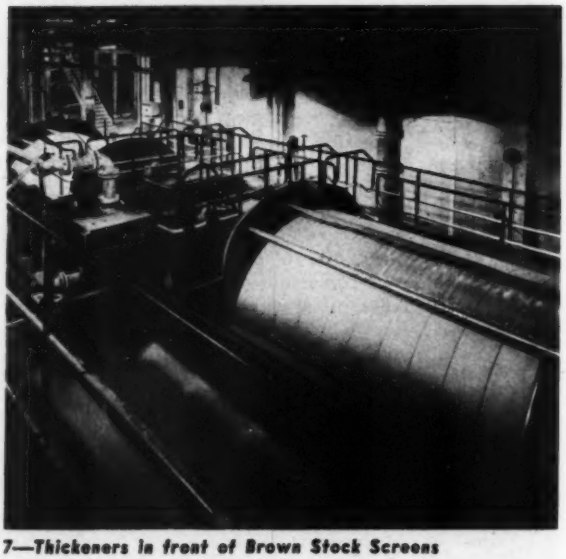
It is particularly significant, therefore, that although this project was delayed because of wartime conditions, the organized effort behind it did not weaken, and slightly more than eleven years after the first announcement that such a mill was planned, the LongLac Pulp and Paper Company brought into production a fine pulp mill embodying the newest and most modern equipment, as well



1—Chip Screens . . . mounted on rubber cushions



4—Digester Operating Floor

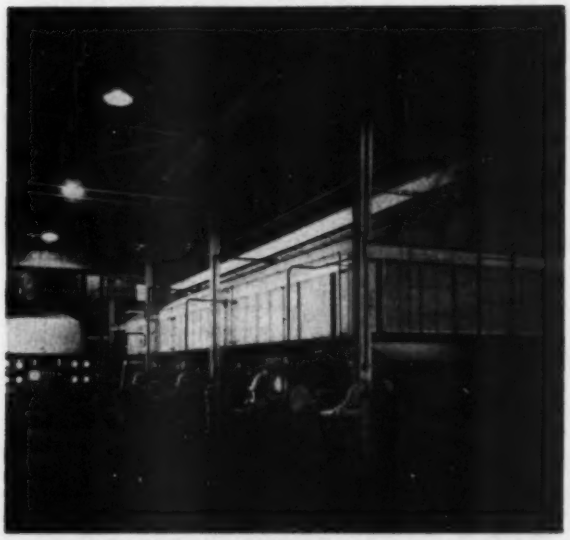


7—Thickeners in front of Brown Stock Screens

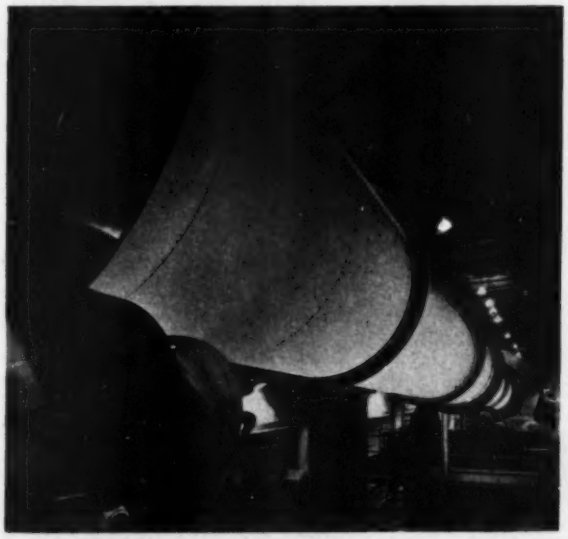
2—Chip Bin Feed Conveyor distributes chips continuously

3—Mezzanine of Causticizing Building

5—Digesters . . . 3750 cubic feet . . . direct steamed

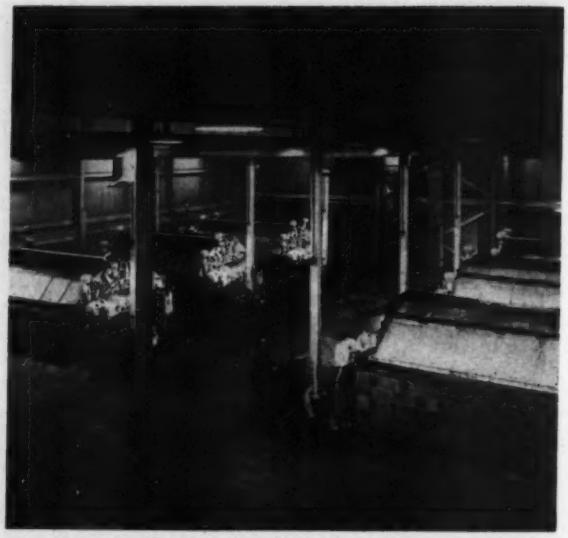


6—Brown Stock Washers & Blow Tank



8—Rotary Kiln for burning lime sludge

9—Recovery Unit & Panel Board



10—Operating floor of bleach plant

11—Sheet formation . . . pulp forming sheet

12—Pulp formed into sheet . . . cut . . . sent to storage

as an adjacent townsite with modern living accommodations for its workers. Nearby is the great waterpower project on the Auguasabon River, which was built by the Ontario Hydro Commission to provide the power for this industrial area. This modern power plant has two generators, each 27,500 hp.

Process Engineering

The plan for this plant was worked out according to the most efficient engineering principles. Every phase of production was studied carefully, looking toward complete processing co-ordination.

The efficiency curve starts when the pulpwood leaves the water; it is brought to the mill by a 1,600-ft conveyor. Another conveyor (1,425-ft) transports the wood to the wood yard or to the mill (Link-Belt Conveyors).

The *Chip Screens* are suspended type Tyler Ty-Rock, mounted on rubber cushions to alleviate vibration, and screen out the sawdust and oversize chips, which are then recrushed. A minimum of sawdust and oversize chips are produced with a Carthage ten-knife chipper which precedes the screens, but their presence insures good chips, which is a basic requirement of pulp uniformity.

Chip Bin Feed Conveyor—This United Steel Conveyor tripper automatically distributes chips continuously from one end of the chip bin to the other, helping in obtaining chip uniformity through blending. The bottom of the chip bin below forms a tent-like surface and the chips are withdrawn from the outside. The room formed in the space below houses the bark presses.

The walls of the chip bins are heated by air pulled in from the lime kiln building.

Chips are removed from the bottom of the bins by traveling screws which also traverse from one end of the bin to the other, further blending for chip uniformity.

Causticizing Building houses the sludge pumps and causticizing tanks, all a part of the Dorr system. Its unique layout affords ease of operation and makes for cleanliness.

The six *Digesters* by Dominion Bridge, 3,750 cubic feet, are direct steamed. They are equipped with remote operated Yarway blow valves and Foxboro automatic steaming control.

Two lines of *Brown Stock Washers,* manufactured by Sherbrooke Machineries Limited, wash the liquor from the stock prior to evaporation and recovery.

Thickeners, made by Oliver United Filters, Inc., remove the water after the screening. Brown stock is screened on 12 to 28 plate screens, each having two sections of 14 screen plates. The short section is capable of very high screening capacities as is evidenced by the small number of screens doing the job.

Lime Kiln—Lime sludge from the causticizing department is recovered as calcium oxide in the 300 ft by 8 ft Allis-Chalmers lime kiln. This kiln is equipped with 50 ft of chain section. At present, it is oil fired, but is being equipped to use producer gas. The kiln is supported at five points with trunnions, is driven with a four-speed motor, and is equipped with auxiliary gasoline drive in event of power failure. It was put on high foundations to eliminate the nuisance of a pit at the hot end. Hood draft is controlled automatically by the induced draft fan. Forced draft is manually controlled.

Recovery Unit & Panel Board is claimed to be the largest Combustion Engineering recovery unit in operation at the present time. It is estimated that its production is in excess of 350 tons of pulp and 150,000 tons of steam per hour.

Bleachery machinery was manufactured by Sherbrooke Machineries Limited. The bleaching is performed in a standard manner by chlorination in the first place, caustic extraction in the second, calcium hypochlorite in the third,

caustic in the fourth, and sodium hypochlorite in the fifth. The operation is unique in that only the first stage is low density; all subsequent stages operate at consistencies 14% or better. Recording instruments in general are on the main panel, but those controls necessary for the immediate operation of the washers are on the console panels at the individual washers.

In the Machine Room—Pulp, after bleaching, is formed into a sheet on two Kamyr wet ends and dried very economically in the Flakt nine pass dryer. It is cut on a Paper Machinery Ltd. cutter and handled from there to storage on a Matthews Conveyor System.

The Townsite at Terrace Bay has grown from camp proportions to a community of modern homes. There is a school and a hotel, a shopping center, bank, and moving picture theater. No effort or expense has been spared to surround the workers in the LongLac mill with all of the comforts and conveniences of comfortable living.

Mando Paper Machine Modernized

▸▸▸ RECENTLY REBUILT and modernized, the No. 4 paper machine at the Minnesota and Ontario Paper Company's International Falls mill is now in operation. This rebuilt paper machine, complete with new electric drive, head box, presses and fourdrinier section, is now capable of producing a greater range of higher grade paper products than had previously been possible, according to Donald D. Davis, company president.

The remodeling of the machine, coupled with the operation of the company's new bleaching and pulping facilities not only increases production capacity but produces new products and also gives a greater measure of operational flexibility.

It is expected that both bleached and unbleached kraft and sulphite grades will be processed on the newly designed machine, company officials revealed.

Featuring the latest type sectional electric drive, the revamped paper machine is capable of producing in excess of 120 tons per day. Its speed ranges from 200 to 1,200 fpm. Prior to modernization, this machine, in operation since 1910, had been powered by a 400-hp Corliss type steam engine and was driven through an English rope system drive. The new system consists of a motor generator set and eleven variable speed d-c electric motors. Electronic controls regulate and co-ordinate the units of the new "sectionalized" system.

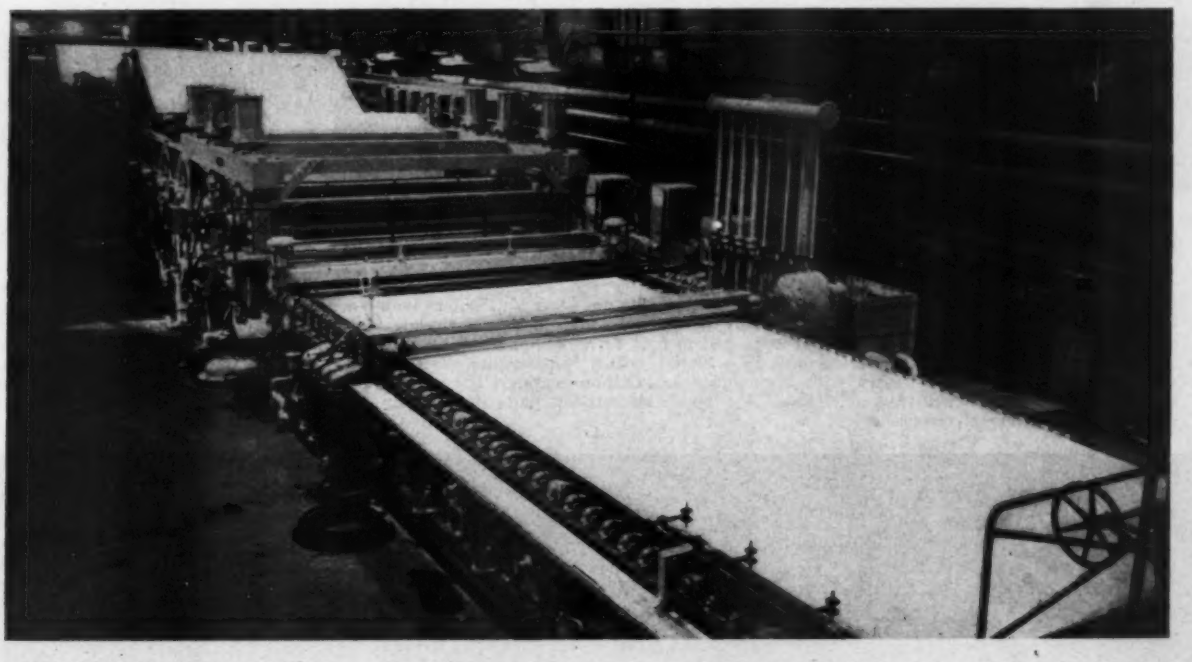
The remodeling project includes the installation of four new Bird screens, replacing three of smaller size, and the replacement of the head box with one of larger capacity and improved design. Another feature of the modernization is the introduction of a new double slice, permitting more uniform stock flow control.

The fourdrinier section has also been rebuilt and materially improved to obtain better stock formation and to permit increased machine speeds. Wire length has been increased from 70 ft to 100 ft and eight new suction boxes have been installed. A new 36-inch diameter suction couch roll replaces one of smaller proportions. The addition of another suction press and a smoothing press was also included in the rebuilding process.

Increased dryer capacity has been provided with the installation of a section of seven new dryers, contributing materially to the machine's productive capacity. Also, a size press has been added to the machine to permit the manufacture of offset and other surface sized fine papers.

On the dry end of the machine, the calender stack frames have been remachined and replaced, and the latest design of Pope type reel has been installed.

The modernization and improvement of the No. 4 paper machine is a part of Mando's $17,000,000 improvement program, started in 1945, to be completed this year.

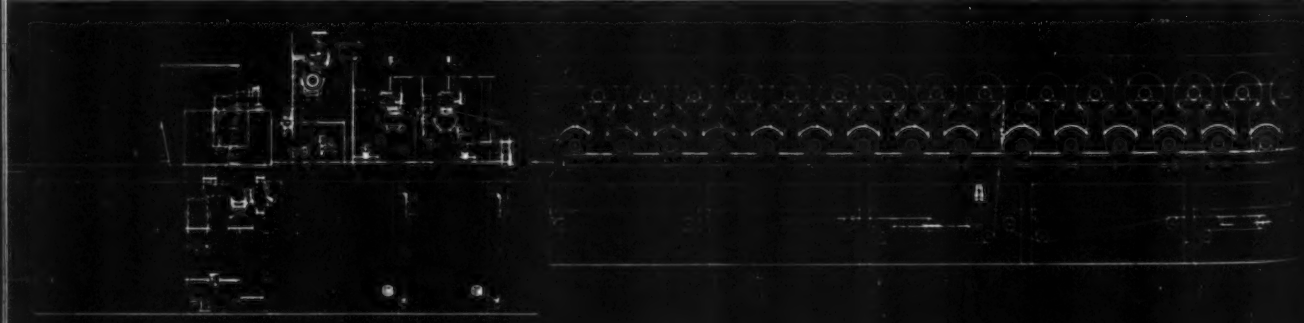


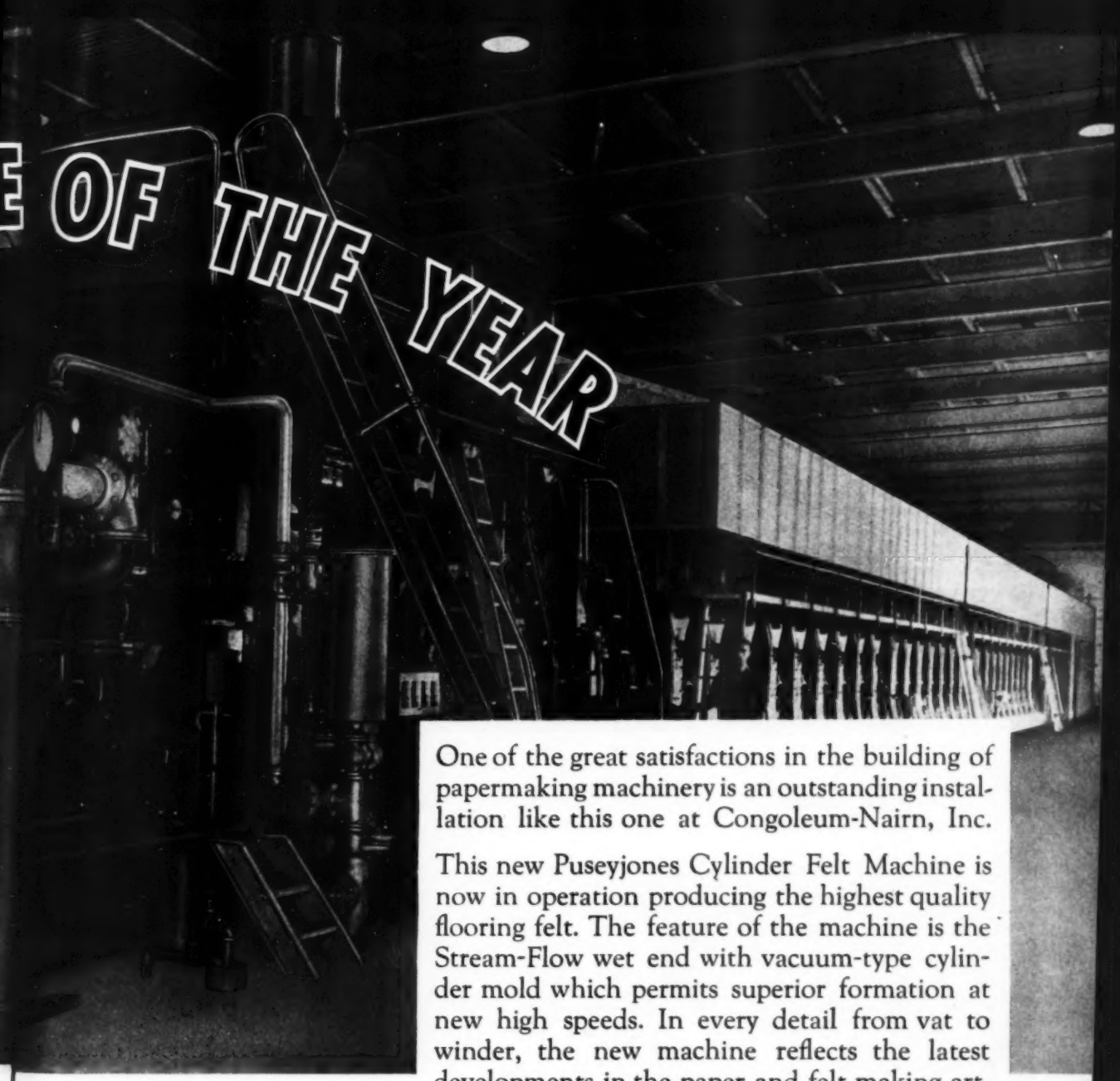
PAPER MACHINE GETS NEW LOOK . . . Mando's No. 4 paper machine at International Falls has been rebuilt and modernized

CYLINDER MACHINE C

168" Puseyjones Single Cylinder High Speed Felt Machine in Cedarhurst, Maryland, mill of Congoleum-Nairn, Inc. Designed and built for the manufacture of highest quality Flooring Felt.

Line drawing of new machine. Features include latest type Stream-Flow Vat System with Vacuum Cylinder Mold, Flow Spreader and Up-Flow Head Box; Press Part of pneumatically operated Simplex design, including suction primary press, main plain first press and forward suction second press; Dry Part arranged in four drive sections with sixty-seven 60" diameter dryers mounted in anti-friction bearings, with enclosed gearing, and rope carrier system for threading the sheet; latest type Steam Joints with dual revolving siphons; One 3-roll Calender Stack with heavy duty anti-friction bearings; Pope-Type Reel; Unwinder with pneumatically operated brake; 2-Drum Winder with hydraulic unloading table; all rotating parts dynamically balanced for top driving speeds. Multiple-generator type sectional electric drive.





One of the great satisfactions in the building of papermaking machinery is an outstanding installation like this one at Congoleum-Nairn, Inc.

This new Puseyjones Cylinder Felt Machine is now in operation producing the highest quality flooring felt. The feature of the machine is the Stream-Flow wet end with vacuum-type cylinder mold which permits superior formation at new high speeds. In every detail from vat to winder, the new machine reflects the latest developments in the paper and felt making art.

THE PUSEY AND JONES CORPORATION
Established 1848. Builders of Paper-Making Machinery
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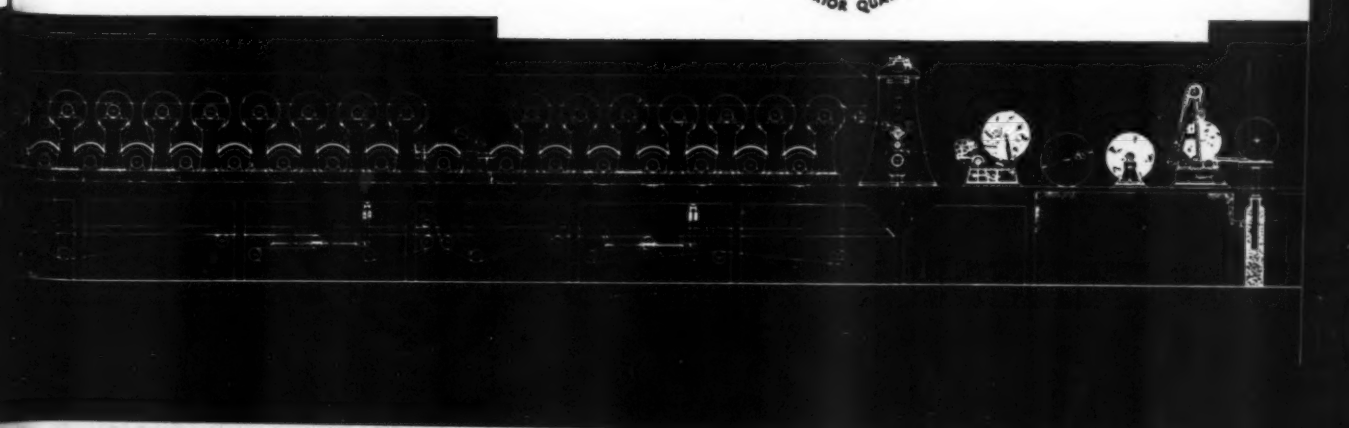

Trees for Tomorrow Marks Fifth Year—Will Expand Activities

▶▶▶ PAPER INDUSTRY'S reforestation organization, Trees for Tomorrow, Inc., completing the first five-year span of a 25-year program, re-elected the following officers at its annual meeting held in Merrill, Wisconsin, March 17:

President—Folke Becker (president, Rhinelander Paper Company).

First Vice President—E. B. Hurst (head, Woodlands Division, Consolidated Water Power & Paper Company).

Second Vice President—C. G. McLaren (vice president, National Container Corporation of Wisconsin).

Secretary-Treasurer—D. B. Smith (president, Ward Paper Company).

Executive Director—M. N. Taylor.

These officers, together with the following officials of the ten sponsoring paper mills, make up the Board of Directors: Stanton W. Mead, vice president, Consolidated Water Power & Paper Company; D. C. Everest, president, Marathon Corporation; A. J. Schierl, secretary-treasurer, Whiting-Plover Paper Company; N. S. Stone, vice president, Mosinee Paper Mills Company; K. S. Dickinson, president, Tomahawk Pulp Company; Leonard Kuehl, vice president, Kansas City Star Division, Flambeau Paper Company; Robert Caldwell, vice president, Rhinelander Paper Company; E. G. Ingalls, vice president, Wausau Paper Mills Company; E. E. Zahn, Woodlands Department, Marathon Corporation.

Plans to expand the activities of the organization were acted upon. The tested procedure of distributing trees, mapping privately owned woodlands, and educational phases will be extended throughout northern Wisconsin and the upper peninsula of Michigan. Plans were also made to extend the membership of the organization to include industries from outside the original territory of seven counties set up in 1944.

President Folke Becker, who has headed the unit since its founding in 1944, pointed out the tremendously increased interest in tree planting, and said that at the end of the 1949 planting season three million seedlings will have been distributed by the organization in the past five years.

Forty thousand acres of privately owned woodlands have been mapped by Trees for Tomorrow foresters, M. N. Taylor, executive director, said in his annual report. He emphasized the importance of this phase of the in-the-field assistance to small land owners.

Other functions of the organization discussed were: the operation of the Trees for Tomorrow Camp in cooperation with U. S. Forest Service; the results of the foresters' visits to 40 schools during January; forestry scholarships; and the production of a new movie. Extension of the Trees for Tomorrow program will progress on a county to county basis.

▼

ECA PLANS TO CONTINUE AID FOR THE PULP AND PAPER INDUSTRY OF EUROPE

▶▶▶ EUROPE'S once flourishing pulp and paper industry, in a badly deteriorated condition during and since the war, is beginning a slow climb to recovery with the assistance of raw materials and machinery financed by U. S. dollars, according to a release by the Economic Co-operation Administration.

Europe still is unable to supply its own needs from its pulp and paper industry, yet before the war it was not only self-sufficient, but exported large quantities of both pulp and finished paper to the rest of the world. With ECA-financed assistance, Europe has more mills operating and more paper available for consumers today than a year ago.

Production estimates for the current fiscal year, ending July 1, 1949, as compared with the previous year, indicate that total board and paper production

***BOARD OF DIRECTORS** of "Trees for Tomorrow" and representatives of member mills at annual meeting held in Merrill, Wis.: Seated (L to R)—C. G. McLaren, vice president, National Container Corp., Tomahawk; D. B. Smith, president, Ward Paper Co., Merrill; Folke Becker, president, Rhinelander Paper Co.; E. B. Hurst, head, woodlands division, Consolidated Water Power & Paper Co., Wisconsin Rapids; D. C. Everest, president, Marathon Corp., Rothschild; Leonard Kuehl, vice president, Kansas City Star Div., Flambeau Paper Co., Park Falls. Standing—M. N. Taylor, executive director, Trees for Tomorrow Inc., Merrill; E. E. Zahn, Marathon Corp., Carl Bronsted, manager, Tomahawk Pulp Co.; N. S. Stone, vice president, Mosinee Paper Mills Co.; K. S. Dickinson, president, Tomahawk Pulp Co.; Stanton W. Mead, vice president, Consolidated Water Power & Paper Co.; Chet Cone, manager, woods dept., Wausau Paper Mills Co.; E. G. Ingalls, vice president, Wausau Paper Mills Co.; Harry Fitze, secretary, National Container Corp.; Robert Caldwell, vice president, Rhinelander Paper Co.; E. E. Emerson, Mosinee Paper Mills Co.; Howard Palmquist, head, woodlands division, Marathon Corp.*

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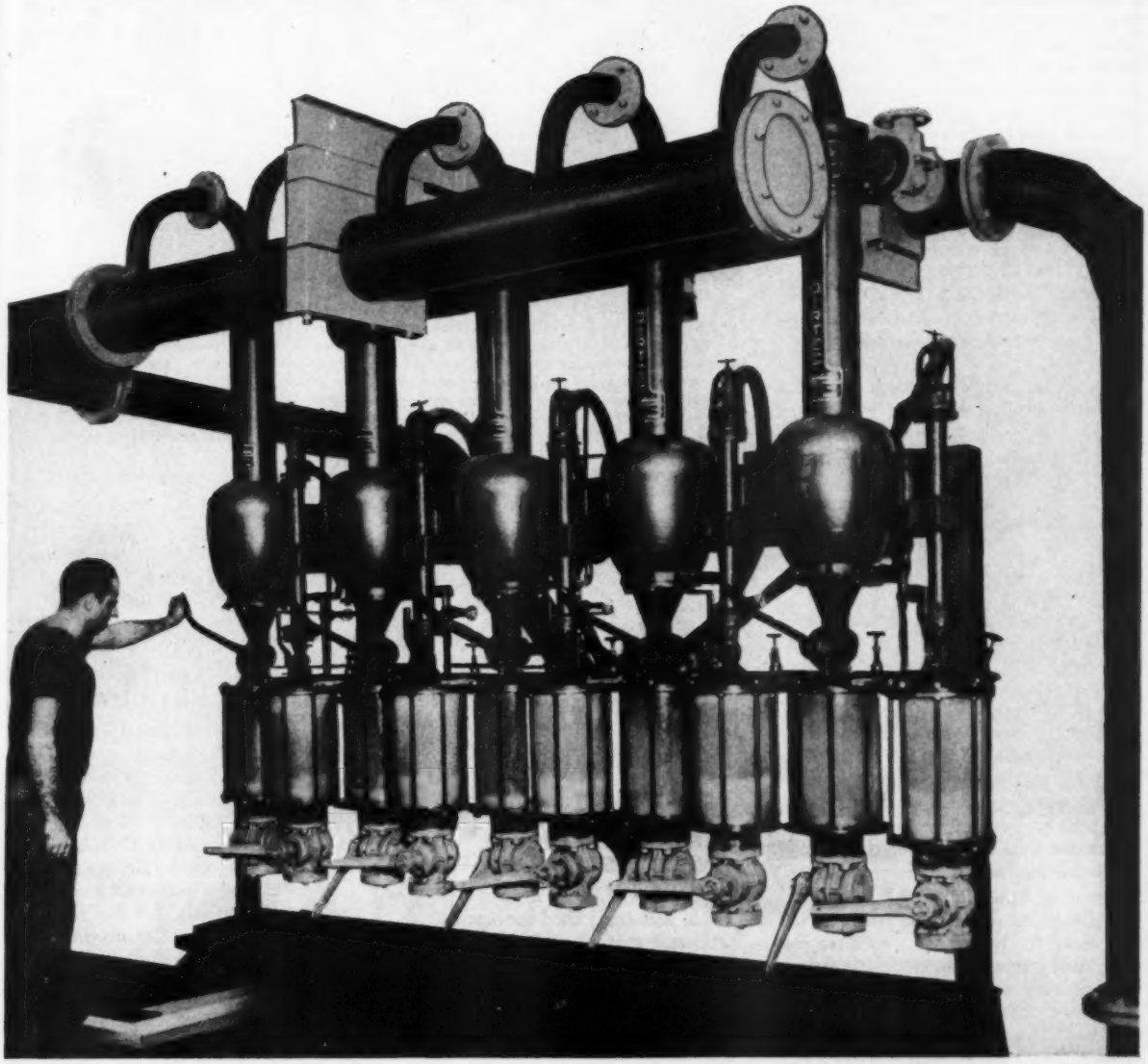
Your **CUSTOMERS** *And Your* **COMPETITORS**



DIRTECS provide a quick, sure, inexpensive way to meet today's exacting standards of paper cleanness. Easy to install and operate—readily adaptable to all kinds of dirt conditions, stock conditions and volume requirements.

Dirtecs get the dirt out of the stock, for good and all. It cannot get back into the system.

Better find out what Dirtecs can do for you. Now is the time to make the most of them.

BIRD MACHINE COMPANY

SOUTH WALPOLE • MASSACHUSETTS

will be up nine per cent in England, 36 per cent in France, 32 per cent in Holland, and 40 per cent in Belgium.

A lack of pulpwood from Eastern Europe, an important source before the war, is one of the reasons why Europe, despite the recent increases, is still 20 per cent below prewar production. Other reasons are the restrictions placed on production and consumption by government legislation, and war damage, as yet unrepaired, to the paper mills of Europe, especially those of Germany.

In its effort to revitalize the pulp and paper industry in the war-damaged countries, ECA has financed the purchase by European countries of about $53,000,000 worth of pulpwood, pulp and paper and about $3,000,000 worth of production machinery during the first year of the European Recovery Program.

About $31,000,000 worth of raw materials and Canadian newsprint covered on contract were authorized for procurement by the United Kingdom. About $10,000,000 worth of pulps were authorized for Bizone Germany, $3,000,000 for France, and something less than $2,000,000 each for Italy, The Netherlands, Belgium and Ireland.

In all cases, ECA has avoided authorizations for purchase of finished paper products unless the needs of the country made it absolutely necessary. The policy has been to encourage the shipment of pulpwood to be processed into pulp or the shipment of pulp to be made into finished paper by European workers in their own mills.

About 90 per cent of the authorized purchases were for raw materials in the United States and Canada and the remainder in European countries.

ECA plans to continue its financial assistance for the recovery of Europe's pulp and paper industry, authorizing procurement of raw materials in about the same volume and by the same countries. As the aid continues and the industry revives, ECA expects to authorize an increasing amount of dollars for capital expenditures in machinery and equipment and a decreasing amount for raw materials from North America.

▼

LARGE CLASS IS GRADUATED FROM THE C-W PAPER SCHOOL

Diplomas were granted to 167 students of the Crown-Willamette Paper School at the 16th annual graduation exercises in mid-March. This is the largest group graduated since the 1941-42 exercises. The class was made up of students from Crown Zellerbach Corporation at Camas, West Linn, and Portland and from the Pacific Coast Supply Company of Portland, Western Waxed Paper Company of Portland, and Zellerbach Paper Company, Portland.

In the 16 years the school has been operating 2,160 diplomas, have been presented. The diplomas this year were presented by F. N. Youngman and the honor awards by A. G. Natwick, assistant Camas resident manager.

***FOR THREE HOURS** this group of students enrolled in the new Pulp and Paper Technology course at Western Michigan College in Kalamazoo, Mich., watched the various operations of the modern deinking system, stock preparation system, and paper machine operation at Allied Paper Mills in Kalamazoo. Later they visited the coating mills. They were welcomed by Wm. Kirkpatrick, Allied's technical director, and were conducted on their tour of instruction by John Dam of the company's technical department. The students were accompanied by several members of the faculty, including Dr. A. H. Nadelman, professor of pulp and paper technology*

▼

PENNSYLVANIA IS 25TH STATE TO JOIN IN "KEEP AMERICA GREEN" MOVEMENT

Pennsylvania, long a pioneer in the field of forestry, joined the Keep America Green movement March 11. The action was taken at Harrisburg during the sixty-second annual meeting of the Pennsylvania Forestry Association, sponsor of the Keep Green program in that state.

Twenty-five states are now actively participating in the national Keep America Green forest fire prevention program. These states represent well over half of the nation's land area.

The address of James H. Duff, governor of Pennsylvania, was one of the highlights of the Keep Green organization meeting. Following his talk, the governor received the Pennsylvania Forestry Association's "Conservation Award." The Pennsylvania organization is the oldest state forestry association in the United States. In 1948 the state had an outstanding forest fire prevention record, holding its losses to 12,700 acres burned over.

Named as chairman of the state Keep Pennsylvania Green committee was P. H. Glatfelter of the Glatfelter Paper Company, Spring Grove, Pennsylvania.

▼

DILL & COLLINS DIVISION CLOSED—MEAD TRANSFERS MFR. TO CHILLICOTHE MILL

Closing of its Dill & Collins Division in Philadelphia on April 5 has been announced by The Mead Corporation for the reason that its modern mill at Chillicothe, Ohio, is better equipped to manufacture quality Dill & Collins grades at an economically sound level.

The Philadelphia plant has made brush coated papers, and that work will now be carried on in Chillicothe. About 245 employees at Philadelphia were affected by the order.

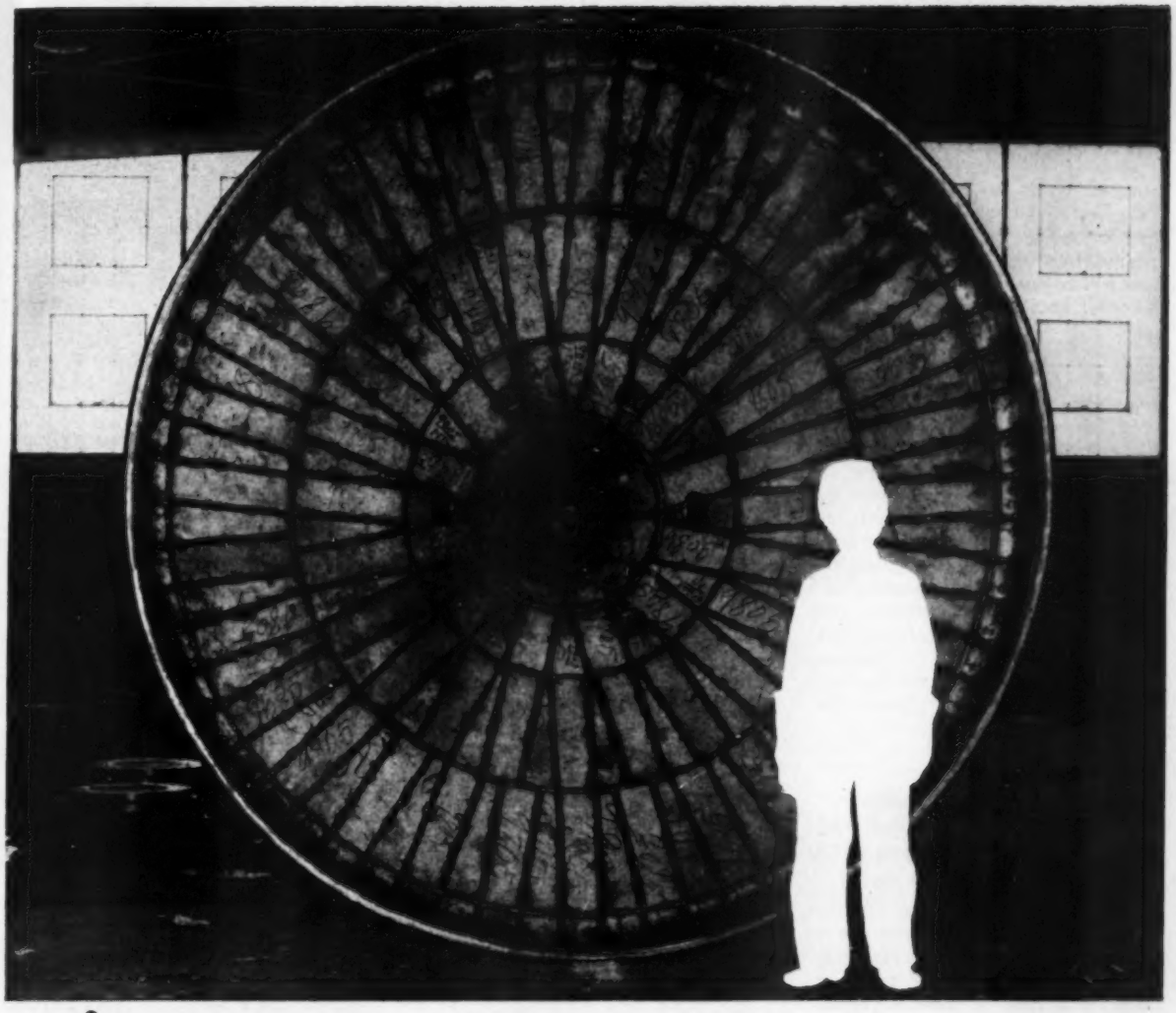
▼

▶▶▶ CONSTRUCTION of a five-story warehouse at the Niagara Falls plant of Kimberly-Clark Corporation is expected to begin in the near future, and is scheduled for completion about December 1. It will be used to store finished products of the local plant.

▼

GAIR WILL COMBINE DOWD CARTON OPERATIONS WITH ITS MONTVILLE DIVISION

The carton equipment and business of M. S. Dowd Carton Company, Groton, Connecticut, which was recently acquired by Robert Gair Company, Inc., New York, (cf P. I. and P.W., March, 1949) will be moved to and



There's a welder in this picture...

WE'VE drawn his outline in this picture just so you'd get the idea. But what we really mean to call attention to is his handiwork. The special anti-corrosive lining in the digester bottom shown here is the product of the welder's torch.

Supplying the pulp and paper industry with "custom-made" digesters and steel tanks with these acid-resistant linings is a regular function of our shops. We're equipped to do x-raying and stress relieving, too. Cylindrical and spherical pressure vessels, flat-bottom storage tanks, Marx Savealls, elevated water tanks—all belong on the list of products used in pulp and paper mills. For more details, or for quotations, write our nearest office.

A train load of pulp digesters, each 8 ft. in diam. by 31 ft. 8 in., are shown in this view leaving our Birmingham plant on the way to a pulp mill in Louisiana.

CHICAGO BRIDGE & IRON COMPANY

Atlanta, 3.....2143 Healey Building
Birmingham, 1.....1511 North 50th Street
Boston, 10.....1026-201 Devonshire Street
Chicago, 4.....2445 McCormick Building
Cleveland, 15.....2267 Guildhall Building
Detroit, 26.....1566 Lafayette Building
Havana.....402 Abrau Building
Houston, 2.....2143 National Standard Building
Los Angeles, 14.....1559 General Petroleum Building
New York, 6.....3350-165 Broadway Building
Philadelphia, 3.....1653-1700 Walnut Street Building
Salt Lake City, 1.....1527 First Security Bank Building
San Francisco, 11.....1217-22 Battery Street Building
Seattle, 1.....1927 Henry Building
Tulsa, 3.....1651 Hunt Building

Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY, and GREENVILLE, PA. In Canada: HORTON STEEL WORKS, Limited, FORT ERIE, ONT.

consolidated with the Connecticut Cartons division of the Gair Company, located at Montville, Connecticut.

Production will be under the direction of C. S. Huestis, division manager, and folding carton sales under Thomas E. Cathcart, Jr., New England sales manager.

Connecticut Cartons is making all types of cartons. The Thames River division, into which the Dowd equipment will be moved, makes paperboard and solid fiber shipping containers.

▼

▶▶▶ A CO-OPERATIVE lease arrangement for a new experimental forest 10 miles west of Hoquiam, Washington, has been entered into by the St. Regis Paper Company and the Pacific Northwest Range and Experiment Station. A 20-year program of forest management research will be set up in this tract of land, which is in second growth western hemlock and is owned by the paper company. The U.S. Forest Service will furnish working plans for obtaining information on silvicultural methods, wood utilization, thinning, forest regeneration, costs and returns.

▼

KODAK OPENS A PANAMA LABORATORY FOR TROPICAL PHOTOGRAPHIC RESEARCH

A new research laboratory designed for the study of photographic materials under tropical conditions was opened March 17 by the Eastman Kodak Company in Panama City, Panama. Its facilities include a modern 2-story, 10,000 sq ft building in the Juan Franco area of Panama City and a jungle test station on Barro Colorado Island in Gatun Lake, which is part of the Panama Canal.

Attending the reception held in connection with the formal opening in Panama City were officials of the Republic of Panama and the Canal Zone, the architects, construction engineers, and Eastman Kodak Company personnel.

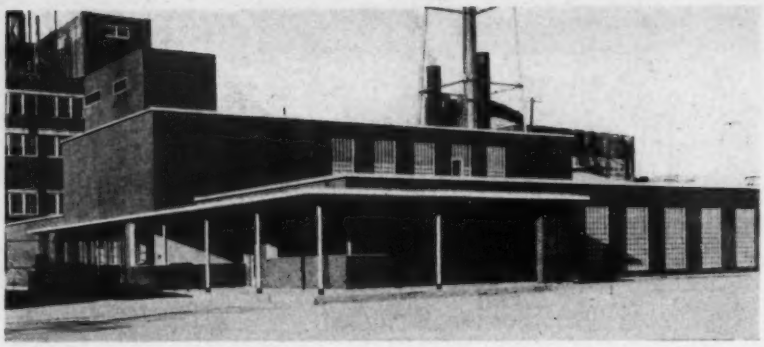
▼

NEW PLANT IS NOW TURNING OUT SEMICHEMICAL PULP

For the first time, semichemical pulp is available in commercial quantities. This was announced by George Kress, president of the Green Bay Pulp and Paper Company, Green Bay, Wisconsin. This company's new pulp mill started operations late in March.

Marketed at a price equal to that of ordinary unbleached sulphite, the output of the new plant is approximately 50 tons per day of neutral sulphite pulp. Heretofore, all manufacturers of semichemical pulp have used their product in their own papermaking operations and it has not been available to other mills in quantities sufficient for full-scale operations.

The principal advantage of the semichemical process is that it utilizes a greater portion of the wood than conventional chemical pulping methods. Made from poplar, this neutral sulphite pulp is a short fibered, easily refined pulp with good drainage characteristics, and it is suitable for a variety of grades of paper and board. Its availability will permit mills contemplating the manufacture and use of such pulp to determine its suitability in their own particular grades of paper.



***NEW PERSONNEL FACILITIES** building, Crossett Paper Mills, Crossett, Arkansas, has just been completed. It is completely modern...of brick...large areas of glass...interior of gleaming tile with banks of steel lockers...the maximum in convenience for all paper mill workers. The building was constructed by Rust Engineering Co.; it is part of Crossett's major expansion program which will be completed in 1950*

▼

▶▶▶ EMPLOYERS OF veterans training on-the-job under the G.I. Bill should notify their State approving agency of any plans to change wage scales or journeymen's rates of pay. The agency to be notified is that which approved the company for veterans' training. In most states, approvals are handled by State Boards of Education, and the Veterans Administration cannot adjust its wage scale records until official notice has been received from the appropriate State approving agency. Addresses of State approving agencies may be obtained from any VA office.

▼

▶▶▶ A NEW HIGH was recorded recently in daily production records at the Dalhousie, New Brunswick, mill of the New Brunswick International Paper Company when 792.7 tons were manufactured. A weekly record of 4,519.4 tons was set during the same period. The new records were consistent with the steady rise over a period of years in the production of newsprint at Dalhousie, L. S. Henry, mill manager, said. The present figures far exceed the originally envisaged production figures of the mill.

▼

▶▶▶ DEDICATION OF the new headquarters of the International Brotherhood of Papermakers, A.F.L., at Menands, New York, drew nationwide interest as labor and government leaders sent congratulations to the 65-year-old union. The $150,000 building was opened to the public after the dedication on February 25 at which Paul L. Phillips, international president, presided.

▼

WEST COAST PULP MILLS AND COLLEGE ENGINEERS LAUNCH STREAM POLLUTION PROGRAM

A comprehensive program just started by West coast pulp mills has been planned to study and work out improvements in stream pollution.

This program is sponsored by the National Council of Stream Improvement, and work already is under way by engineers of Oregon State College. When these studies are completed, it is expected the findings will indicate how to proceed with treatment for Pacific Coast pulp mill waste.

In making the announcement of this work, G. W. Gleeson, dean of engineering at Oregon State College, stated that engineers of the College are now working on four different studies related to reducing pollutional characteristics of sulphite liquor wastes.

Dean Gleeson stated that previous fermentation studies are incomplete, but that new techniques developed by the National Council will be investigated to determine if they can be used successfully with waste sulphite liquor.

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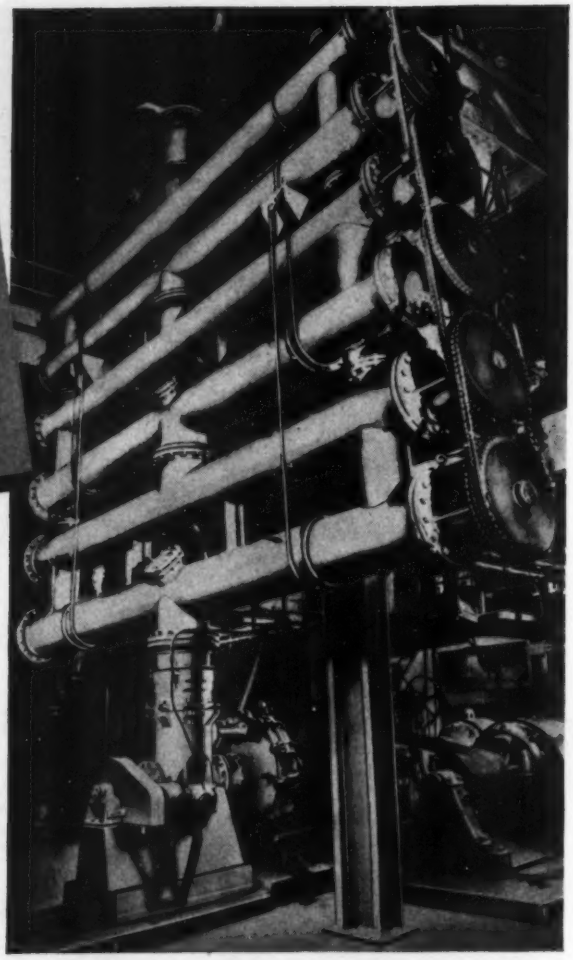

Reaction chambers of Chemipulpers, manufactured by Paper & Industrial Appliances, Inc., New York, N. Y., have been made of Stainless-Clad Steels since 1940.

Stainless-Clad Steel has protected Chemipulpers and their products

Type 304 stainless steel, permanently bonded to conventional steel backing plate, protects this Chemipulper against the attack of chemicals in which the wood chips are cooked. In addition, materials processed are safeguarded against contamination. Thus, both long life and high-quality production are assured.

Lukens makes the most complete line of clad steels available anywhere—Nickel-Clad, Stainless-Clad, Inconel-Clad and Monel-Clad—enabling you to obtain protection against a multitude of corrosive materials. Claddings of these corrosion-resistant metals that are 10% or 20% of total plate thickness meet most requirements. The extra smooth sodium hydride finish on Lukens Clad Steels makes cleaning extra easy and minimizes sliming.

Ask your fabricator to quote on processing equipment made of Lukens Clad Steels. You'll get this built-in protection at surprisingly low first cost and your upkeep charges will also be low. For Bulletins 255 and 338 describing clad steels, write Lukens Steel Company, 408 Lukens Building, Coatesville, Pa.

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BETWEEN THE LINES

It's No Use Waiting... the Stream Won't Dry Up

I like that song . . .
and I'm sure you do, too, but here's a point: If the radio stars keep crooning its poetic philosophy that April showers bring the flowers that bloom in May, almost every home will be decorated with bright, fragrant bouquets before you read this page next month.

Who knows (except some obscure scientist) but that within another quarter of a century, people will go about, irrespective of the season, with a minimum of inconvenience because of the weather. Experiments during the past winter proved that radiant heated pipes under streets and sidewalks disposed of snow and ice. We have various makes of lightweight, transparent rainproof coats, capes, bonnet and hat covers. Men of research now have to master the big job—they must find a way to turn on the cooler when Uncle Sol turns on his heat lamp.

You can't possibly be insolvent . . .
if you're an American. Yes, the American people created for themselves last year nearly twice as much in real wealth as they did 25 years ago. That point was brought out by Du Pont's president Crawford H. Greenewalt when he spoke to the company employees and business leaders on the occasion of the 25th anniversary of cellophane.

The 25 years during which cellophane has grown to maturity, according to Mr. Greenewalt, may well be classified by historians as the most important in the history of the country. In that period we have experienced all types of economic climates—a boom in the twenties, a depression in the thirties, an unprecedented period of wartime production, and the inflationary high-spirits of postwar reaction. Those years have brought about many changes in national thinking and in our habits and customs. They have brought also advances which have had much to do with the present strength and well-being of the American people.

Answering the question "How did cellophane come to attain its present high stature?" Mr. Greenewalt answered: "in part, American ingenuity in research and genius for development; in part, a faith in the future and a willingness to risk the large investments required to push forward a development of this magnitude; and finally, a fair division of the fruits of the enterprise among customer, employee, and investor, to yield the greatest good to the greatest number."

When it was first introduced, cellophane sold for $2.65 a pound. The present price is 48 cents per pound for much-improved moistureproof cellophane.

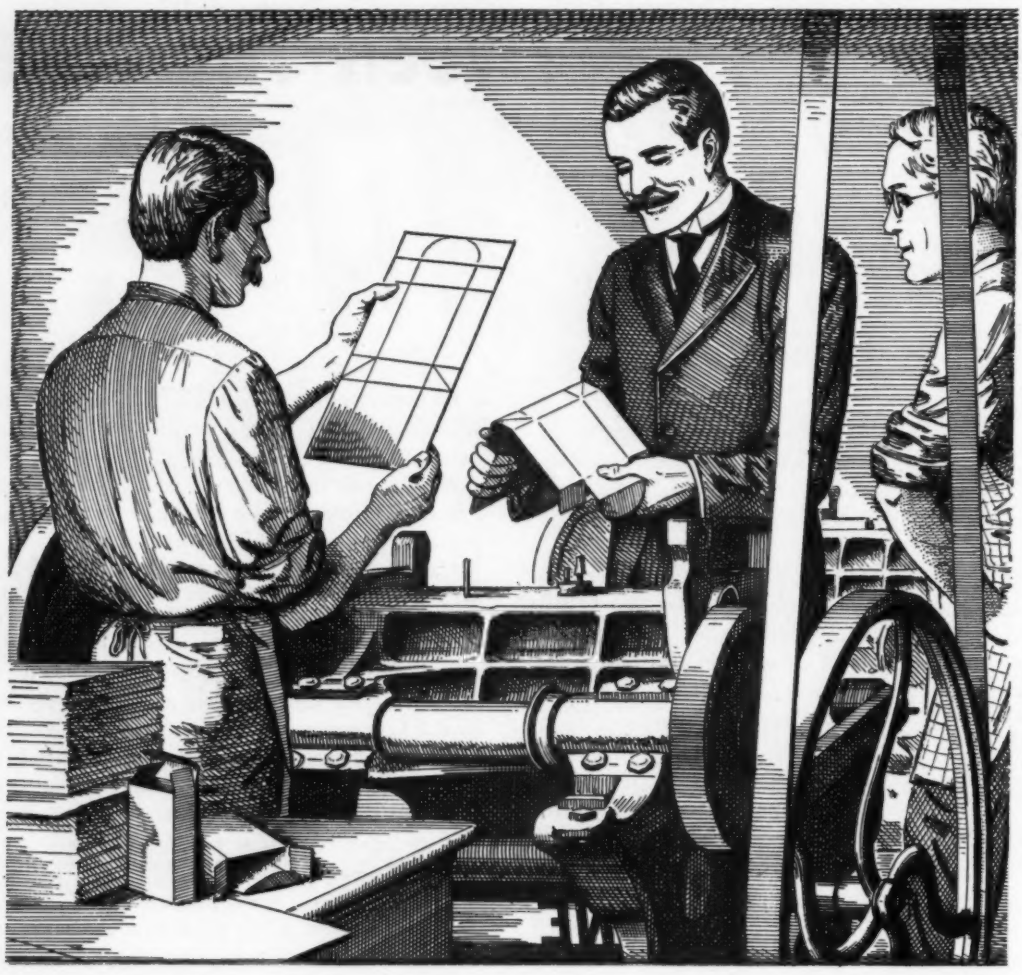
The balloons need some air . . .
or we won't get to where we want to go. Incidentally, I don't mean automobile tires—but those beautiful colored bobbing balloons on the end of a long stem. Since my childhood days, I have never quite lost my fascination for those gorgeous balls of color. This is really only anecdotal treatment for a subject that stands for one of the most important personal and national problems. You guessed it—I mean the cost of living. But even statistics can draw enthusiastic comment when the curve points down. The Bureau of Labor Statistics states in a report just released that the index on February 15 stood at 169 per cent of the basic 1935-1939 average. This represents the fifth straight month in which the index has dropped.

When I read this there came a flash-back to that never-to-be-forgotten time of rationing and red points. I recalled the indifference of a butcher shop clerk who in answer to a simple question said "Lady, I don't have to know any answers; the meat just sells itself." I couldn't restrain the retort, though I'm sure it was not heard, "Some day you will try to sell better meat than this."

A man who wanted to fish . . .
was the character in a story that went around several years ago. He found the sun on the bank so warm and he became so drowsy that he spent most of his time sleeping. Maybe he dreamed it that way, I've almost forgotten that part, but he thought the stream would dry up—then the fish would still be there and he wouldn't have to catch them. When he woke up, the fish were still there, but the water in the stream was a bit higher than when he went to sleep.

The only way to bring in the fish is to go out and catch them.

—by Bessemer



The Accident that Revolutionized Box Making

In 1879, Robert Gair noted that a rule had cut through the paper of some seed bags printed in his shop. The bags were a loss, but the accident gave Gair an idea. If a printer's rule which had become sharp could cut paper, perhaps it would also cut cardboard. If so, why not use a combination of sharp and dull rules to cut and crease folding boxes in a single operation, thus making economical mass production possible? It worked! At first, printing presses were used to form small folding boxes, but soon special machines were turning out large boxes, their exteriors printed, lithographed and embossed.

Robert Gair's accidental discovery revolutionized box making, had a far-reaching effect on packing, shipping and merchandising. Thus began one of the most important developments in the progress of the essential paper and paper-board industries.

The dramatic story of paper is told in the sound-and-color film, "Paper — Pacemaker of Progress," and in a book under the same title. Both are presented by F. C. Huyck & Sons as a tribute to the Paper Industry. The book will be sent free upon request.

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Thilmany's No. 2 mill boasts new Beloit paper machine, Babcock & Wilcox boiler, and many other improvements

Progress at Thilmany

▸▸▸ THE PAST YEAR has been a busy one at Kaukauna, Wisconsin. It saw the completion of a number of projects designed to improve production and efficiency at Thilmany Pulp & Paper Company. While the two big projects were a new paper machine and a new boiler, many other items of modernization were also completed. These include the construction of a new warehouse and a new garage, together with numerous installations of new equipment throughout the two mills of this company.

Thilmany doesn't ever expect to complete its modernization program. From its very inception there has been a record of continuous modernization, and the company always has been quick to adopt new ideas that would improve quality or efficiency. Even though the original No. 1 paper machine installed in 1889 is still operating, three other machines, built between 1895 and 1897, have been retired from service since the war. These three machines, among which was the first "Yankee" or "Flying Dutchman" to be installed in America, have been rebuilt and are now operating in mills in South America, Ohio and China.

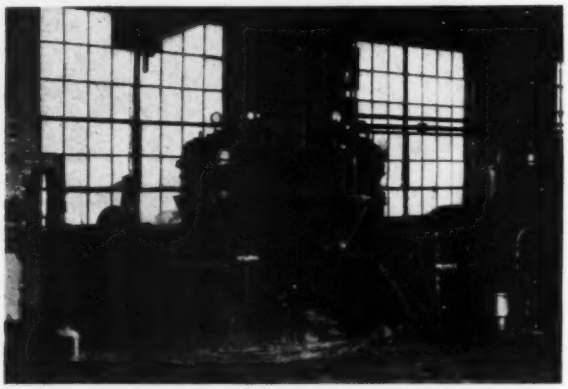
One of this country's great specialty mills, Thilmany makes literally thousands of grades of paper. Fully integrated, this company's facilities include a kraft pulp mill, seven paper machines and five converting plants that turn out such varied products as heavy creped kraft for insulation backing, asphalt laminated papers, printed and decorated wrapping papers, waxed and thermoplastic papers, M.G. kraft, glassine, and greaseproof papers. Latest addition to the complete line of specialty bag machines is a new garment bag machine that further widens the variety of products made at Kaukauna.

The new machine built by Beloit Iron Works incorporates many features that make it the most versatile of Thilmany's seven paper machines. Most of these features already had proved valuable on previously installed machines, but, combined on No. 10, will make possible a wider variety of papers than were made heretofore on any one machine. Already, No. 10 has turned out papers ranging from 10 to 120 lb basis weight in a full range of colors and grades.

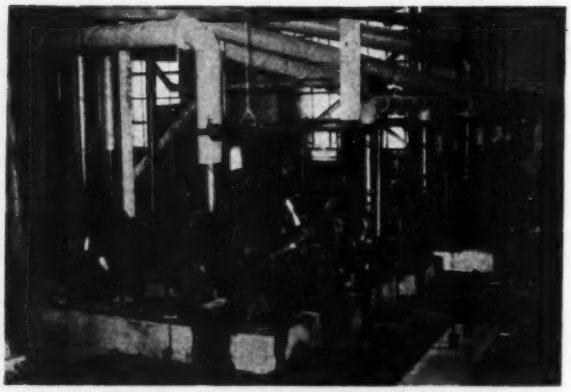
No. 10 is the third 120-inch machine at Thilmany, and was so designed for maximum interchangeability

No. 10 wet end equipped with duplex breast roll, double shake, duel press; note the absence of screens

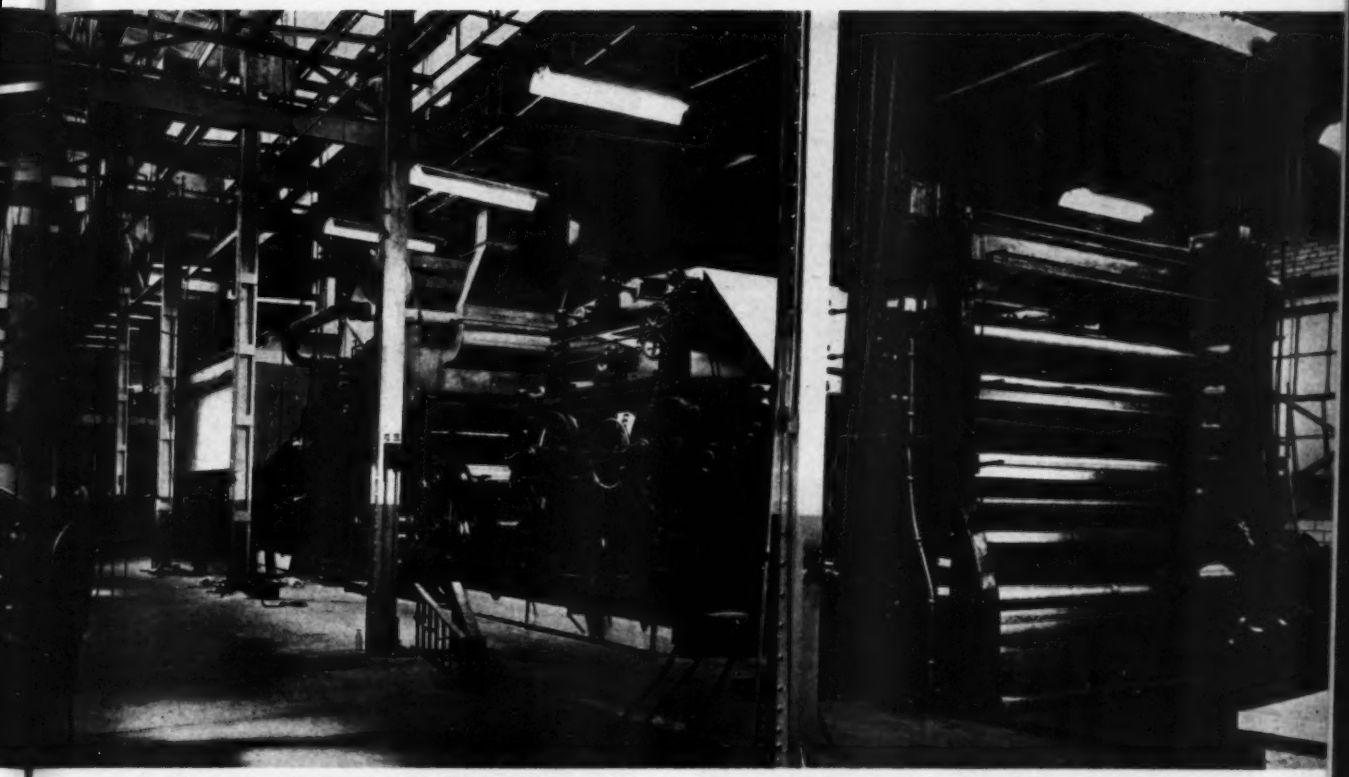
Twenty primary and ten secondary Dirtec units insure clean paper



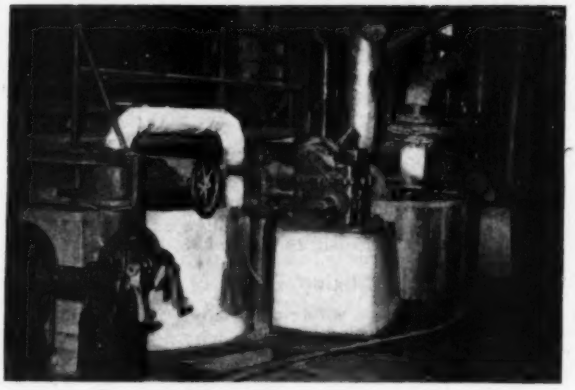
Furnish is pulped and mixed in Vortex beaters



Stock is refined by three Morden Stock-Makers and one Miami No. 6 Jordan in series

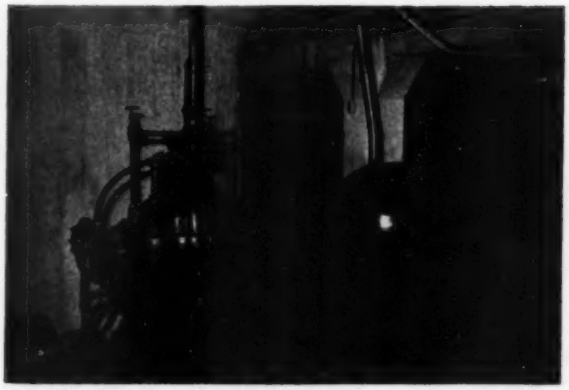


No. 10 is a combination Yankee with a predryer section, Yankee, and afterdryer section; size press follows Yankee

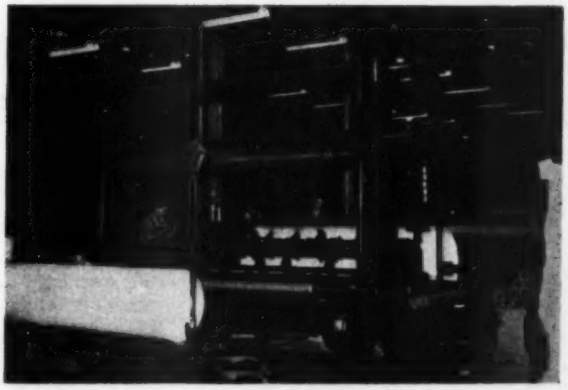


Refined stock is mixed with white water in cylindrical concrete mixing tank

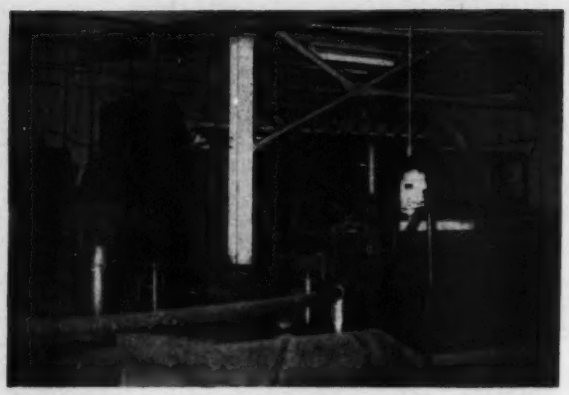
Size press (still under wraps) will be used for special papers



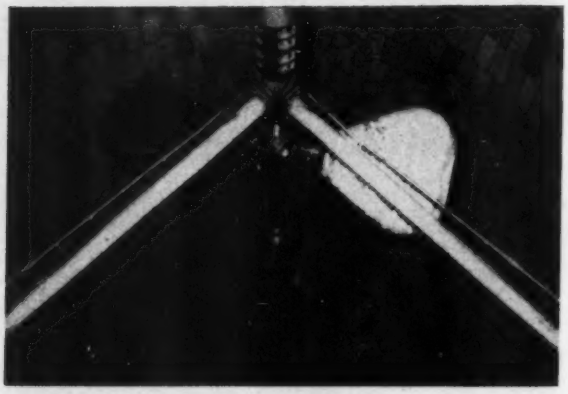
Fan pump sends stock through the Dirtec units to flow box



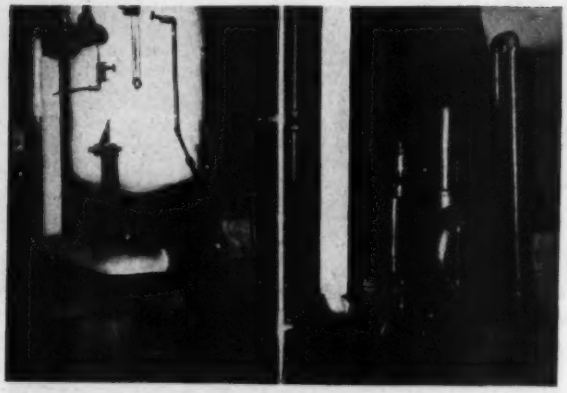
Beloit winder driven by individually controlled variable speed motors



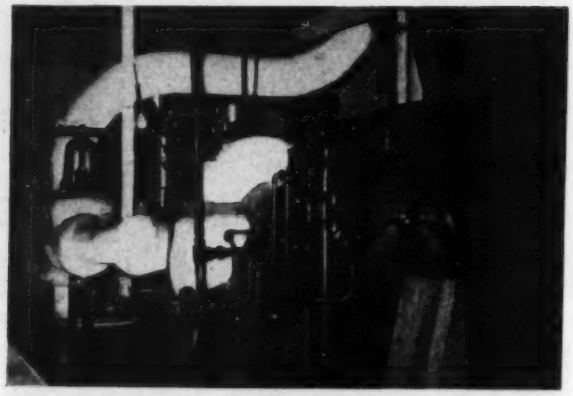
White water and stock from couch pit are separated in Oliver save-all



Stock chests are tile lined and equipped with Shartle propeller type agitators



Midwest-Fulton drainage and forced vapor system used on dryers



Line shaft in basement is driven by a Westinghouse turbine through a reduction gear

of parts, clothing, and equipment. For instance, the same fourdrinier wire can be used on both No. 9 and No. 10 machines. The M.G. felt of No. 10 can be used on No. 8 machine; many rolls and other parts are also interchangeable.

A combination Yankee, this machine is comprised of a fourdrinier wet end followed by a pre-dryer section which precedes the 12-ft Yankee dryer. From the Yankee dryer the sheet passes through a size press before entering the afterdryer section which, in turn, is followed by a calender stack, reel and rewinder. Adequate space and drive facilities for a second stack are provided in case it should be desirable to increase the calender capacity.

Stock Preparation

Furnish consisting of slush pulp, laps or baled pulp, together with color, size, etc., are charged to either of the two 2,500-lb Vortex beaters in batchwise fashion. When thoroughly pulped and mixed, the batch is dumped to a drop chest and pumped to the beater chest. From the beater chest the stock is pumped to the adjacent machine chest, where a float type level regulator controls the operation of the pump. Level control of stock in the machine chest provides a constant head for the Shartle triplex pump that transfers stock from the chest to the refiner head box. Although *p*H controllers are in use on other machines, this variable is still measured and controlled manually. However, a Foxboro-Backman *p*H Controller will be installed in the future.

Both beater and machine chest are vertical, cylindrical, conebottom, tile-lined vessels equipped with Shartle propeller type agitators. Each chest has a capacity of 6,000 lb of dry stock and the design of these chests makes them easy to clean, which is desirable where frequent grade and color changes take place.

Stock flows from the refiner head box through the three Morden refiners in series and is pumped to a second head box which feeds the single Miami No. 6 Jordan, and then to a third head box from whence the finished stock goes direct to the mixing tank of the machine. Control of stock to the machine is achieved at the Morden head box so that an excess of stock doesn't pass through the refiners. Use of individual head boxes for each operation aids in obtaining maximum uniformity in developing the fiber. Because of the frequent weight and grade changes there is no storage chest or surge tank for refined stock. Instead, the stock passes direct from the Jordan to the mixing tank.

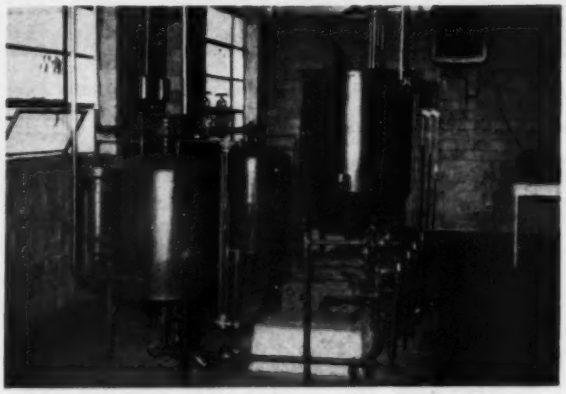
Mixing Tank

White water from the stainless steel trays under the wire flows to the cylindrical concrete mixing tank, which is about 6 feet in diameter and extends to the basement floor. Stock from the head box enters through a pipe that extends several feet below the top of the mixing box. Excess white water overflows to the couch pit. This mixing tank is larger than is usually employed; this not only makes for better uniformity of mixing but aids in deareating the stock to the machine. White water and stock from the couch pit are sent to the Oliver save-all operating at a vacuum provided by a barometric leg.

The Ingersoll-Rand fan pump (a 4,700 gpm, 110 ft head, 150 hp pump) takes stock from the mixing tank and pumps it through the Bird Dirtec units, and then to the flow box, from which the stock flows to the machine head box. Since the Dirtec units operate under positive pressure, the

Locomotive helped furnish steam during construction of new boiler

New boiler replaced two old ones to increase steam output



Chemical tanks and proportioning pumps for feed water treating system

Electric Machinery magnetic clutch and controls for induced draft fan

fan pump capacity is higher than ordinarily required. The stock is first pumped through twenty primary Dirtecs and then ten secondary Dirtecs.

The paper machine is equipped with a Valley Iron Works stock inlet, and a head box constructed of Johns-Manville Chem-stone. Clean stock from the Dirtecs goes to a *stainless steel* lined, wooden flowbox, from which it discharges by gravity through several stainless steel tubes to the machine head box. Screens are not used on the machine. Much of the stainless steel equipment, including the large size thin wall tubing is fabricated in Thilmany's own shops, which boast of top notch welders as well as other craftsmen.

Outstanding Features

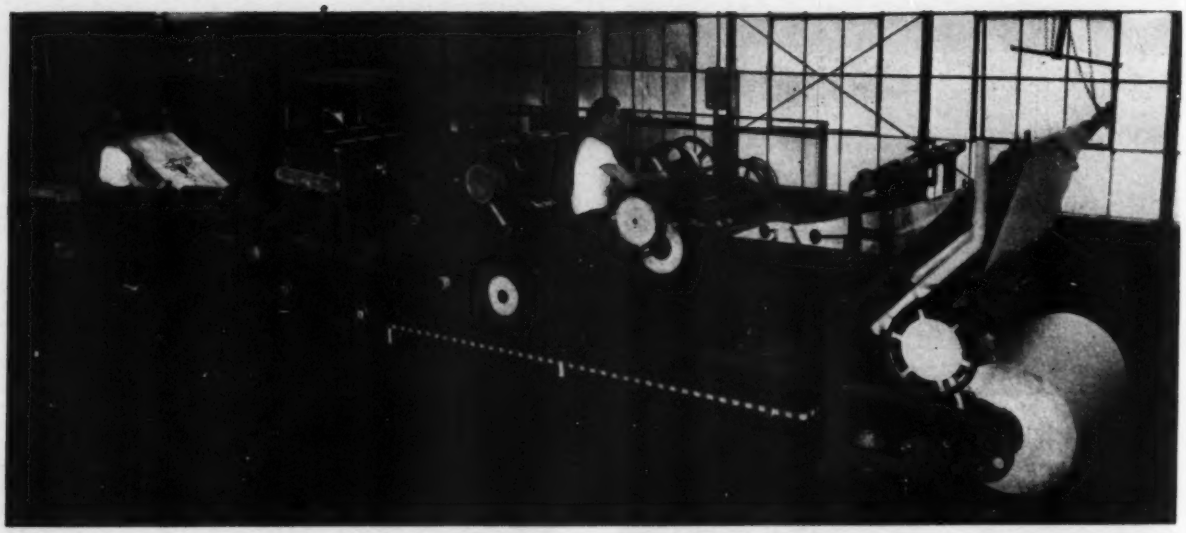
A number of features distinguish the Beloit fourdrinier which forms the sheet on a 135 in wide by 75 ft long wire. Use of a double shake, one at the breast roll and the other about 10 ft forward, add flexibility. The new duplex breast roll arrangement (patented by Rice Barton Corporation) is built into the wet end. Here, the large breast roll is positioned a foot or so lower and somewhat to the rear of the smaller breast roll which is positioned under the slice. The large primary roll thus carries the load or strain of the taut wire, whereas the secondary roll, which is adjustable to the slice, can be smaller since it does not carry a very great load. Use of a small secondary roll in the ordinary breast roll position provides greater variety of adjustments between the wire and the slice, and permits table rolls to be positioned closer to the breast roll to eliminate wire sag. This arrangement had already been used successfully on No. 8 machine, so was thus incorporated in the new machine.

Six oscillating suction boxes use the Broughton vacuum system, wherein vacuum is supplied by barometric legs. Here the barometric legs are 16 ft long with water seals in the basement. The suction boxes are arranged in two groups of three, between which is positioned the dandy roll when used. The wire continues to the 25-inch diameter vacuum couch roll without changing pitch, and the wire guide roll is located in the first position after the couch on the return side. A lump crusher roll is positioned on top of the couch.

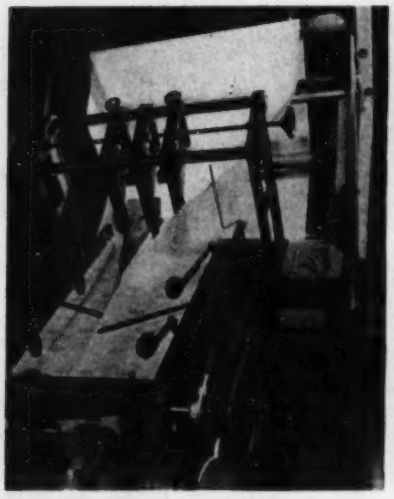
From the couch, the sheet passes direct to the press felt without going under an air roll. This is possible because the felt is at the right level to take the sheet from the couch. The Beloit dual press is a combination suction and plain press. The 25-inch diameter brass suction roll runs against the relatively soft (50 plastometer) rubber covered center roll, while the second press roll is covered with rubber of ordinary hardness (about 35 plastometer). Use of a soft center roll helps eliminate the shell marks often caused by suction presses. The dual press is followed by a plain smoothing press from which the sheet enters the first dryer section. Vacuum for the couch roll and suction press is provided by individual Nash pumps.

Dryer Section

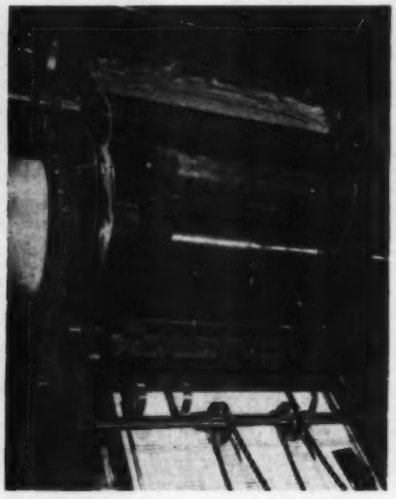
Nine dryers, seven of them 60-inch diameter and two of them 36-inch diameter, together with a top and bottom felt dryer, make up the first section of dryers. This is followed by a 12 ft Yankee equipped with antifriction bearings. The Yankee dryer had been purchased in 1945 and was carefully stored in a special heated building until time of installation. The Yankee dryer frame was designed at



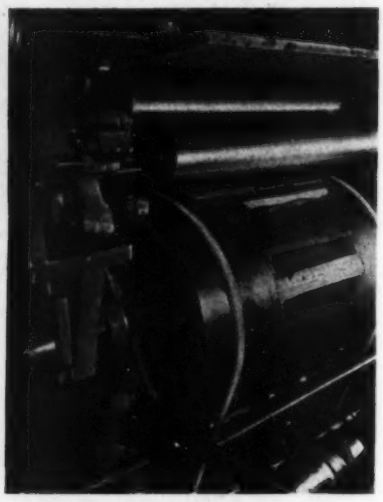
Newest addition to the converting plant is the Potdevin garment bag machine. Capable of producing plain and printed bags ranging from 18 in. wide by 22 in. long to 26½ in. wide by 64 in. long, this machine can produce either square pinch bottom, flat, or shouldered flat bags. Printing is accomplished by two colors of oil ink with rubber molded printing plates



Paper comes in from the feed to be folded over the former



The "cut-off" cuts the continuous tube to desired length



After pasting, the bag goes into the printing press

Thilmany and was fabricated of welded steel.

In addition to being equipped with a hydraulically operated rubber covered marking roll for impressing a design on the damp sheet, the Yankee is also equipped with a small felt dryer roll for the M.G. finishing felt. Both of these features are not new at Thilmany since they have proved satisfactory and are in use on other machines.

Installation of a size press following the Yankee is an innovation and will be used to treat special new grades of paper. The size press precedes the section of after dryers, comprised of four 60-inch dryer rolls. The after dryers are not covered with a hood, but the first section of dryers and the Yankee are equipped with individual hoods and exhaust systems. These were designed by Thilmany's own engineering department and are fabricated of sheet Transite.

No. 10 machine is driven by a 375 hp Westinghouse steam turbine hooked up to the line shaft which drives the machine through a system of belts and cone pulleys. Mechanical clutches on the individual sectional units are provided, and draw adjustments are made electrically. The Beloit Winder is driven by variable speed Reliance Motors with individual motor and speed control to provide better control of this operation.

Exhaust steam from the turbine drive, together with fresh makeup steam, is used in the dryers and is controlled by Foxboro instruments. The Midwest-Fulton drainage and forced vapor circulating system is used on the dryers, and a Bowser lubrication system is also employed.

New Boiler

The second major expansion project for 1948 was the installation of a new 90,000 lb per hour, 600 psi Babcock & Wilcox boiler at the lower mill. Expansion of paper production always means increased requirements for steam and power, and the new boiler should be adequate for any further expansion for the next few years. While the boiler installation has been completed, delivery of the 4,000 kw, 600 psi non-condensing steam turbine exhausting at 40 psi has been delayed, so until this power generating equipment is installed the boiler will continue to operate at 200 psi, the same

(Turn to page 63)

Safety Contest Pays Off

M. B. RITTMAN, Safety Director
The Standard Register Company

▸▸▸ CONTESTS MUST BE so designed as to exclude no one in the plant. Therefore, this feeling of active participation is the strongest possible foundation on which to build a program of safety education among employees.

Using this basic principle, the Standard company has produced a number of successful competitions. But the most successful in the company's history—considering both employee interest and results — was the recent "Safety Poker" contest conducted throughout the company's main office and plant at Dayton.

The contest was ideal because it permitted participation of every employee, including office personnel. Only the author and one other contest official were declared ineligible. Even the company's president, M. A. Spayd, was one of the contestants.

To operate the contest, dubbed "Safety Showdown," it was necessary to imprint regular plain-backed playing cards with five different safety slogans. With approximately 1500 employees in Dayton, the cost of the cards was $60, with an additional expenditure of $70 for imprinting.

A special announcement broadside was prepared and distributed to every employee to start the contest. These broadsides, printed in two colors and specially designed, cost $200. In addition, 40 special posters were prepared (by photostat) at a cost of $6.00. Before the contest started, the aggregate cost was $336. At its conclusion $366 more had been paid out for awards. This made the total basic cost of the contest only $702.

For this low price, how did the contest operate? Was it successful? From virtually everyone at Standard, the answer to the last question is a firm "yes." As for its operation, interest was so easy to maintain that co-operation was complete and the project flowed to a smooth and happy conclusion.

Slogans—Organization

All playing cards were thoroughly shuffled prior to imprinting slogans, which were:

"One Weak Link Will Spoil the Safety Chain"

"Safety Has no Quitting Time"

"Little Injuries Often Lead to Big Infections"

"Drive as if all Children Were Your Own"

"The Cost of Safety Is Only a Thought"

The first week of the contest, employees received the announcement broadside with their first playing card attached. Before distribution, each card was run through an addressograph machine where the employee's name, clock number, and social security number was stamped on the back. This was the simplest method of "dealing" the cards for easy delivery, and at the same time prevented employees from trading cards between themselves, thus insuring an *honest deal.*

After all cards had been dealt, slips bearing every employee's name were placed in a hopper at the Chamber of Commerce office of the Dayton Safety Council. There, the Council's executive secretary drew 50 names, 25 of them going on a primary list, the remainder on an alternate list.

Supervisors were notified if the names of any employees in their department had been drawn on the primary list. Cash to be awarded was sent with the notification. During the contest, all cash payments were made in silver dollars as an added novelty note.

Cash Awards for the Right Answers—and Cards

Cash awards were made as follows: A supervisor approached an employee whose name had been drawn. He asked the employee to recite the week's safety slogan (all cards for the week carried the same slogan). If the employee could comply, he was given one dollar. Then, if he could produce his playing card for the week, he was awarded an additional dollar. In those departments where safety shoes, glasses or other protective equipment is prescribed by factory rules, employees who could first recite the slogan were awarded an additional dollar for each item of required equipment worn at the time approached. If all those on the primary list did not qualify for an award, names were taken from the alternate list until a total of 25 cash awards had been made.

This procedure continued for five weeks. Each week when he received his new playing card, an employee also received a promotional folder listing the previous week's winners At the end of five weeks, every employee had received a complete showdown poker hand.

The names of employees who participated in the safety contest were addressographed from regular plate file kept current in the company's mailing department. Employees who joined the company after the contest opened, were not eligible

Those employees who held what they considered high hands (no attention was paid to suit—three Kings of Diamonds, for example, were permissible) were given entry blanks for the Showdown Jackpot. On the blank, they were required to write an original safety slogan, to be judged in event of ties. Top award was a $50 Saving Bond, followed by a $25 Bond and $10 in Saving Stamps. Four fives won over four fours to take first prize. A high full-house finished third, and other full houses were only "also rans."

Lasting Results

What was accomplished by the contest? Aside from the incalculable employee relations value and the competitive spirit cultivated throughout Standard's plant, there were no lost-time accidents recorded during the contest period.

These accident-free five weeks carried the company over the hump to a goal of one million man-hours with no lost-time accidents, thus qualifying it to receive the Distinguished Service to Safety Award of the National Safety Council.

A safety program is twenty-five per cent supervision of employees and seventy-five per cent employee inspiration.

British Suction Unit Intr

WILLIAM SPIER
and W. A. BARRETT
W. P. Evans and Son
(England)

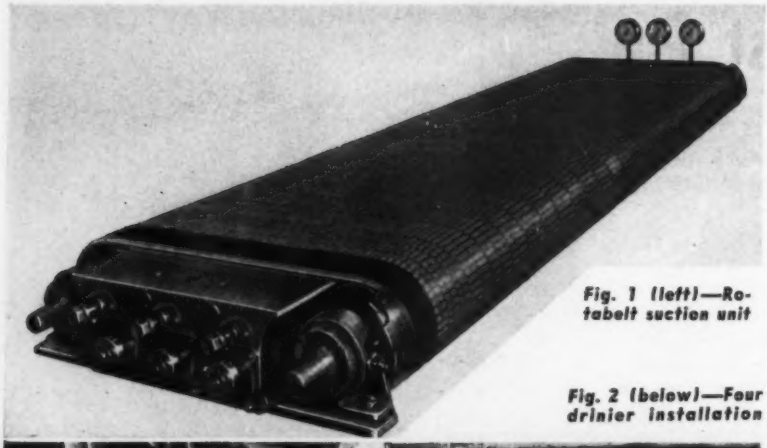
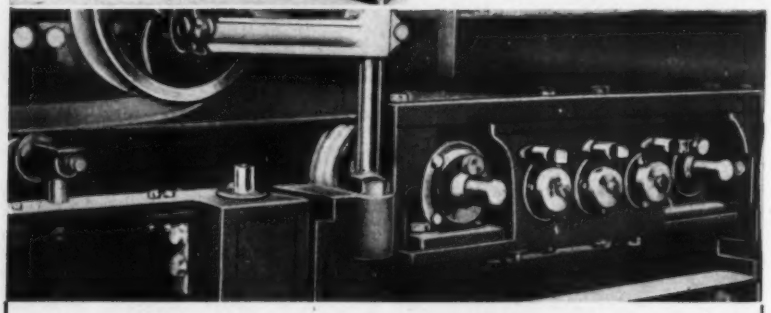


Fig. 1 (left)—Rotabelt suction unit

Fig. 2 (below)—Four drinier installation



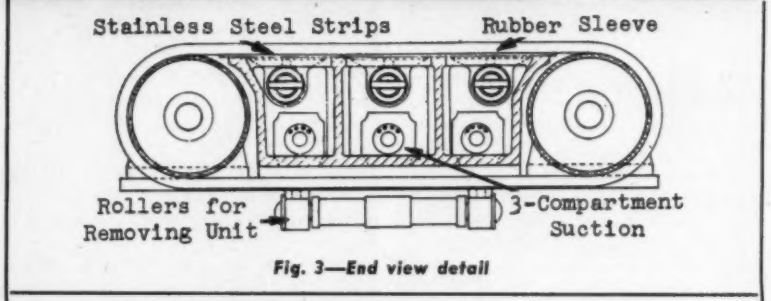


Fig. 3—End view detail

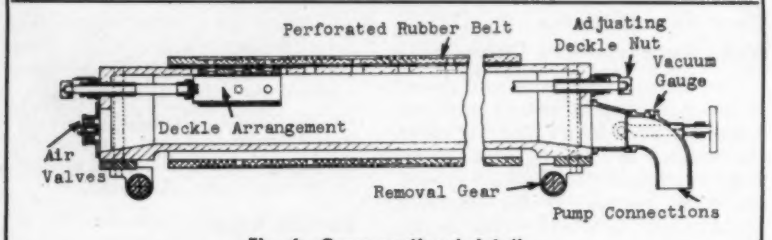


Fig. 4—Cross sectional detail

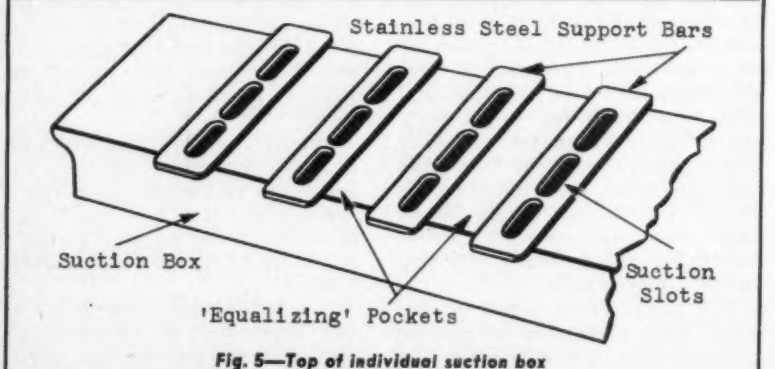


Fig. 5—Top of individual suction box

▸▸▸ LONG A PROBLEM to papermakers and paper machine designers has been the elimination of friction between flat suction boxes and fourdrinier wires. Various types of oscillating devices are widely used for this purpose but only recently has the Rotabelt Suction Unit been introduced in this country.

Over 330 such units are now in use mainly in Britain, Scandanavia, and other European countries, although there are a few installations in Canada and the United States. They are used on both wires and felts for machines making all classes of paperboard, asbestos, and insulating boards, at speeds from 25 to 650 fpm and at vacuums from 2½ to 21 inches of mercury.

The Rotabelt is a device that transfers vacuum from a three compartment suction box to the wire or felt by means of a traveling, perforated belt or sleeve. The standard unit which is shown in some detail in Figures 1 to 5 was designed to fit into a fourdrinier wire frame in place of three or four flat boxes with the minimum of structural alteration and so arranged to match in with the existing suction manifold at the rear side of the machine. In cylinder board machine installations, the unit has been fitted in several positions on the bottom felt, the most beneficial of which seems to be just in advance of the first primary press. In such installations, it has been found possible to reduce the work in the primary presses, giving better "bulk" figures and it is claimed that the life of the felt is increased and "blowing" troubles minimized.

To insure that the operation of this belt is as frictionless as possible, it is kept constantly water lubricated and is run over a series of polished stainless steel plates on top of the stationary box. Most of the wear on the wire is due to the friction caused by the difference in pressure between the topside of the wire (at atmospheric pressure) and the underside where the machine suction conditions prevail.

In an effort to reduce this friction, the suction box top is designed in such a way (see Figure 5) that by having pockets or strips between the stainless steel support bars, this difference in

it ntroduced in America

pressure is partially equalized. So successful was this design that, checked over 200 installations, the average length of working life of the rubber sleeve was five years. Under normal working conditions, the only wearing part is the rubber sleeve which is (unless mill conditions necessitate otherwise) of 9/16 inches thick natural rubber, 120 P & J hardness. The life of this sleeve varies with working conditions and vacuum.

By virtue of the fact that the machine wire or felt is traveling at the same speed as the suction medium, i.e., the rubber sleeve, higher vacuums can be obtained without damage to the wire or felt and consequently water removal from the sheet can be considerably increased. In a recent installation in the south of England, vacuum readings of 20 inches of mercury were obtained on a .020 caliper strawboard and it was found possible to increase the machine speed by 50 fpm and still obtain the same dryness figure leaving the couch roll.

It will be seen from Figure 3 that the suction can be adjusted independently over the three compartments in the standard unit by means of adjusting the vacuum relief valves in the front of the unit. This variation can be further obtained by having vacuum breaker connections on the backside from the suction manifold and quite a few users have further enhanced this by coupling the first two compartments to a vacuum pump separator system, and the last compartment to a separate high-vacuum type pump to give a high velocity, high vacuum condition. The unit is designed for easy cleaning at shutdowns and has instantaneous couplings front and rear. The exits can be easily changed from front to rear if desired to suit mill pumping layouts. In connection with this latter, as a general rule the unit replaces three or four flat boxes so the pump capacity for this number of boxes is required. For installations in the United States and Canada, water and air removal figures have been worked out in relation to Nash vacuum pumps.

Figures 6 to 10 inclusive show several types of installations of the Rotabelt, and it will be seen that little framing alterations are necessary. On an installation similar to that shown on Figure 6 on a fourdrinier wire making .015 caliper board, consistencies of 4.1 and 24.0 oven-dry were obtained before and after one standard Rotabelt unit.

To suit high speed operating and high water removal conditions, a new

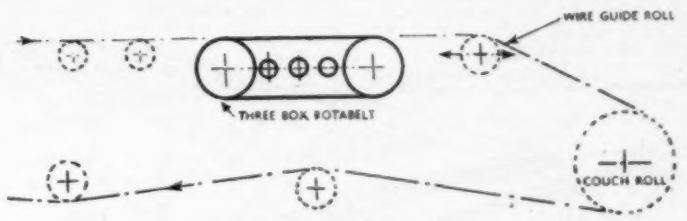


Fig. 6—On fourdrinier wire

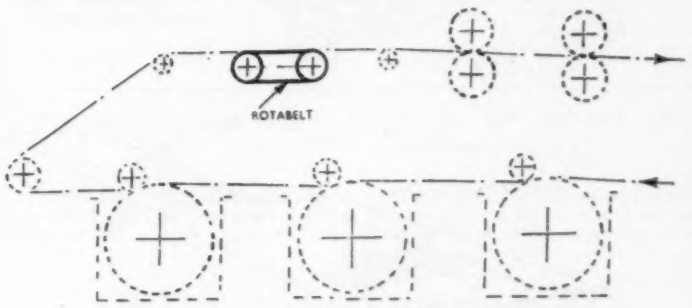


Fig. 7—Cylinder machine bottom felt before press rolls

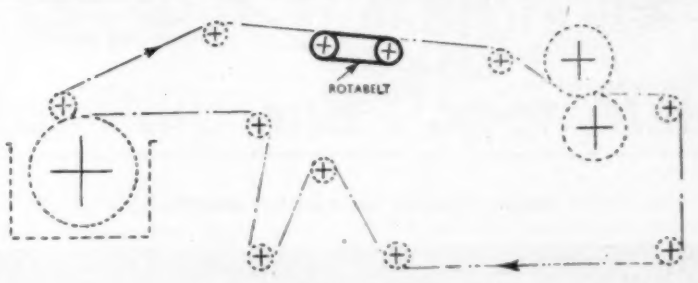


Fig. 8—On asbestos board machine

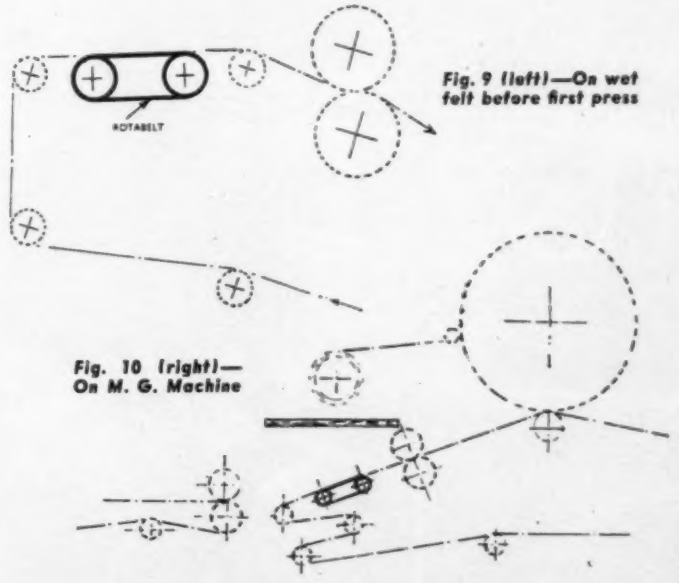


Fig. 9 (left)—On wet felt before first press

Fig. 10 (right)—On M. G. Machine

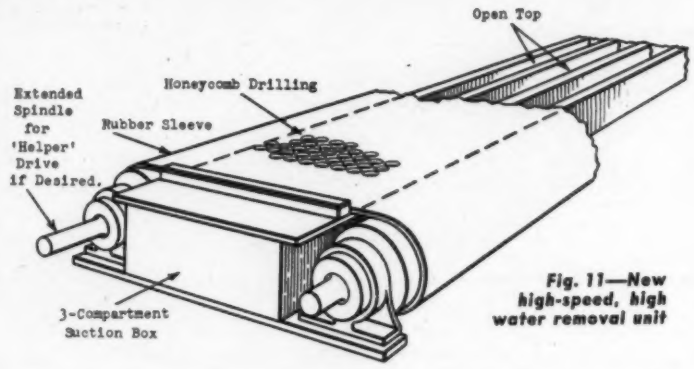


Fig. 11—New high-speed, high water removal unit

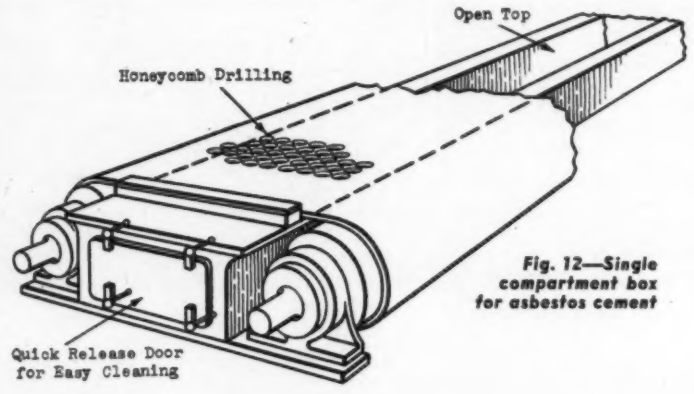


Fig. 12—Single compartment box for asbestos cement

Fig. 13—Cylinder board machine installation

unit has been designed and is being put into operation in one of the largest paper organizations in Britain. This unit embodies several new features including a new type of honeycomb drilling of the rubber sleeve and a new design of box top to suit high speed water removal, but is essentially the same in operation. The outlined layout of this new unit is shown in Figure 11. Arrangement is made in this design for driving the unit if found necessary, with synchronized helper drive, but this will largely be a matter for mill preference.

This unit is considerably longer on the top surface than is the standard unit previously described. This has been done in accordance with the present fashion of not breaking suction once it has been created, and is similar to grouping vacuum boxes together. If the use of a dandy roll is desired, the makers recommend either the use of a smaller wet Rotabelt before the dandy and a large unit after, or the employment of two of the present type wet flat boxes. The use of two ordinary type wet boxes does not unduly decrease wire life as it has been pretty conclusively proved that it is the greater friction on the dry boxes that destroys the wire and limits its life.

Another special adaption of the Rotabelt has been designed for easy cleaning when used on asbestos cement machines and is made generally as shown on Figure 12. This unit which is normally of one compartment only, has an open type top, rubber sleeve of the honeycomb drilled pattern and has special easy removal ends to facilitate easy cleaning when the machine is shut down for any reason. It is claimed that the use of this unit in preference to other type vacuum boxes obtains a greatly increased felt life and also permits of a much higher vacuum condition without damaging the machine felt. The best position for installing the unit seems to be at approximately 6 ft in advance of the forming bowl. In these installations again it will be found better to couple the unit through a separator system to a Nash vacuum pump of a size depending on felt width and machine speed.

All units described here can be obtained with either cast iron, fabricated steel or acid resisting box units, and stainless steel roll ends, etc., can be fitted if desired to suit mill conditions. All bearings employed are of standard design and, where desired, bearings the same as those used on mill wire or felt rolls can be incorporated. Where slime or similar conditions are bad the use of an outside spray in addition to the spray pipe fitted in the unit has proved most useful.

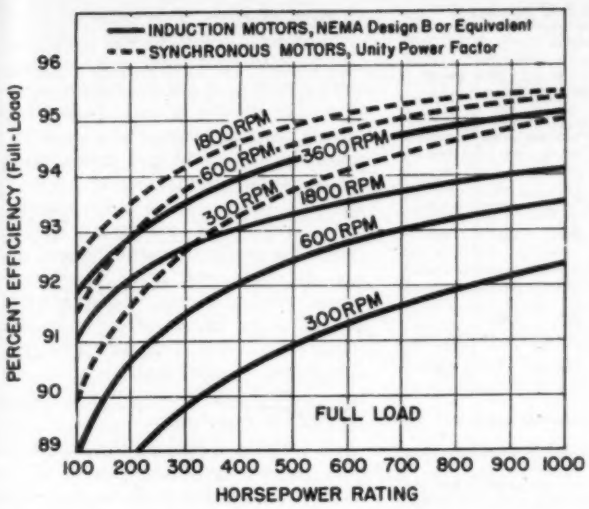


Fig. 1—Efficiency of unity power factor synchronous motors is higher than that of induction motors. Leading pf motors have lower efficiency than unity, but difference is chargeable to pf correction

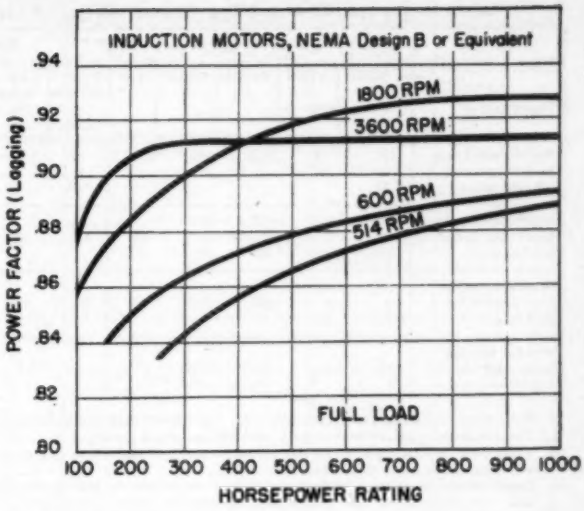


Fig. 2—Power factor of induction motors is always lagging, whereas synchronous motors operate at unity or leading pf at full load, and at part loads the pf of the sychronous motor becomes more leading

How to Select Large A-C Motors for Pulp and Paper Mills

G. L. OSCARSON
Chief Application Engineer
Electric Machinery Mfg. Co.

▸▸▸ VIRTUALLY ALL paper or pulp mill loads can be handled either by synchronous, wound-rotor, or squirrel-cage motors, except for a few applications where variable speed is involved. In most cases, special protective construction is to be preferred. However, mechanical considerations need not influence the choice of type of motor; any desired protective construction can be obtained with either synchronous, wound-rotor, or squirrel-cage motor.

There is usually one *best* selection for the application to fit the electrical conditions involved. The purpose of this article is to clarify the load requirements, and the electrical characteristics of various types of motors, as a guide to making this best selection.

Of first importance is the ability to start and drive the load. Without excessive disturbance to the electrical system, a motor must be able to:

1) *Start the load from rest,* taking into account any normal or emergency unloading measure;

2) *Accelerate to full speed* and, in the case of synchronous motors, *pull into step* without injury to the motor or to the driven equipment;

3) *Operate under normal load conditions* without injury;

4) *Withstand peak loads,* normal for the application involved *without* injury, and without excessive electrical disturbance.

5) *Resynchronize,* if desired in the case of synchronous motor, if the motor drops out of step due to overload or low voltage.

Typical torque, starting kv-a and slip characteristics of synchronous, wound-rotor, and various types of squirrel-cage motors are shown in Table 1.

Beaters, pulpers, and similar machines usually require breakaway torques of about 140 per cent to 160 per cent of full load torque. High torque squirrel-cage motors, or high torque synchronous motors, if power factor correction is extremely important, can be used. If starting kv-a must be limited, wound-rotor motors should be used.

Chippers are high inertia loads and are subject to very high peak load conditions. If system kv-a is limited, wound-rotor or high slip squirrel-cage motors are desirable. These will permit the chipper to slow down when extremely large logs are encountered and thus lessen the shock on the electrical system. If the electrical system is adequate, synchronous motors should always be used. They should have at least 260 per cent pull out torque and be rated 0.8 power factor. Chippers have a low load factor and induction motors operate at a low lagging power factor at light load. Conversely, synchronous motors introduce added power factor correction at light load.

Most other paper and pulp mill loads are quite uniform in nature. They do not require unusual torques either in starting or in operation.

Reliability of operation is highly important. For instance, failure of a chipper motor would shut down an entire mill. Fortunately polyphase motors, either squirrel-cage, synchronous or wound-rotor, if properly applied, leave little to be desired from the standpoint of ruggedness and reliability.

Efficiency is an important factor in selection of paper mill drives. As shown by Figures 1 and 2, except for 3600 rpm, unity power factor synchronous motors provide the highest efficiency. Most paper mill operations are continuous, around the clock. A motor can easily use an amount of electrical energy per year costing twice the

TABLE I—Torque, KV-A and Slip Characteristics of Large A-C Motors

Characteristics	Squirrel-Cage					Synchronous				Wound Rotor
	NEMA B 1800 rpm (or less)	NEMA B 3600 rpm	NEMA C	NEMA D	EM "X"	1.0 PF 500 rpm (or above)	1.0 PF (Below 500 rpm)	0.8 PF 500 rpm (or above)	0.8 PF (Below 500 rpm)	
Normal locked rotor torque in per cent of full load torque	100 to 150	75[1]	225[2]	275[3]	60[1]	85[4] to 100	40[5]	100[4] to 125	40[5]	100[2,3] to 125
Approximate starting kv-a in per cent of full load kv-a	500 to 550	500 to 550	450 to 500	400 to 450	430	550	300	550	300	150
Breakdown torque in per cent of full load torque	200 to 225	200 to 225	225	250	175	150	150	200 to 250	200 to 250	225
Nominal slip, full load, in per cent of synchronous speed	2-3	1½	3-5	8-15	2	0	0	0	0	3

(1) These motors are suitable for coupled duty only. For use with loads which are started substantially unloaded.
(2) These motors develop sufficient torque to start Hydrapulpers or beaters.
(3) These motors will start and operate high inertia and peak load applications, such as chippers off small electrical systems with minimum electrical disturbance.
(4) Lower locked rotor torques with lower starting kv-a are available for light starting duty loads, such as motor generator sets. Also higher locked rotor torques, with increased starting kv-a are available for such loads as beaters, Hydrapulpers, etc.
(5) Higher torques with increased starting kv-a are available for chippers, vacuum pumps, etc.

original purchase price of the motor. During the useful life of the motor the *extra* energy purchased to operate a low efficiency motor can equal the cost of the motor itself.

The 0.8 leading power factor synchronous motor is less efficient than the unity power factor synchronous motor of the same rating. However, it is usually more efficient than an induction motor. In the consideration of leading power factor synchronous motors for paper mill loads, they should not be penalized from the standpoint of efficiency. Actually they are *double-duty motors;* providing mechanical power and a leading reactive kv-a component for power factor correction.

Selection of leading power factor synchronous motors should be given thorough consideration. Most mills manufacture all or part of the power requirements. Low power factor limits the capacity of the generating equipment, reduces the efficiency of this equipment and also of distribution and feeder lines. If power is purchased most utilities penalize low power factor customers. Low power factor loads, in addition, introduce losses and voltage drops in the distribution system which probably cannot be evaluated. However, it must be recognized they are present.

Induction motors have low power factor if operated at light loads. If possible induction motors should be avoided for applications which may run at no load or part load; for instance, chippers are a poor induction motor load from the standpoint of power factor.

The magnetizing component, or lagging reactive kv-a input to induction motors, does not change greatly with changes in mechanical load. In general *each induction motor horsepower on the system will require .35 to .6 lagging reactive kv-a component to magnetize it.* On the other hand each horsepower of .8 leading power factor synchronous motor will provide leading reactive kv-a component as shown in Figure 3. As will be noted the leading component actually increases with decrease in mechanical load.

In ratings of 300 hp and larger, except at 3600 and 1800 rpm, *synchronous motors will usually cost no more than squirrel-cage or wound-rotor motors.* This is also true of smaller horsepower ratings at 450 rpm or less. From the standpoint of first cost and operating cost, taking power factor into account, synchronous motors will be first choice for nearly all constant speed paper and pulp mill loads 100 hp or larger. The exception would be 1800 or 3600 rpm drives where induction motors have very acceptable efficiency and power factor characteristics and have a considerably lower first cost than do synchronous motors.

As mentioned above many paper and pulp mills manufacture part or all of their power. Boiler draft fans operated at adjustable speed by magnetic drives provide excellent control of the boiler draft. The combination of a constant speed motor and magnetic drives provide accurate speed control and quick response when operated with combustion control systems. Magnetic drives are also advantageous for fan and stock pumps.

Motor enclosures for pulp and paper mill motors may be divided into two

TABLE 2—Motor Application Recommendations for Pulp and Paper Mill Drives

Application	Preferred Drive	Factors in Selection	Enclosures
Beater & Pulpers	Wound rotor, or high torque squirrel-cage	High starting torque required. If power factor correction is extremely important use 0.8 leading power factor high torque synchronous motor.	Should be splashproof. Dripproof is absolute minimum.
Jordans & Refiners	Synchronous	Can be unloaded for starting in speed and horsepower range where synchronous motors show to advantage. Can use squirrel-cage.	Should be splashproof. Dripproof is absolute minimum.
Chippers	Synchronous, wound rotor, or high slip squirrel-cage	Should be synchronous motor unless system kv-a capacity is limited. In such case use wound rotor or high slip squirrel-cage.	Open type usually satisfactory. Sometimes protection against flying chips is necessary.
Grinders	Synchronous	Can be unloaded for starting. These drives are in speed and horsepower ratings where synchronous motors show to good advantage.	Duct discharge of cooling air may be desirable to prevent overheating motor room.
Hogs & Shredders	Squirrel-cage	Large hogs or shredders requiring over 100 hp may be synchronous motor driven if power factor correction extremely important.	Dripproof.
Motor-generator Sets	Synchronous	Synchronous motors can be designed, for generator drive, with low kv-a inrush; suitable for full voltage starting. Sets below 100 kw can be squirrel-cage motor drive.	Dripproof.
Pumps—High Speed Centrifugal	Squirrel-cage (all 1800 & 3600 rpm) and below 100 hp. Others synchronous	At 1800 and 3600 rpm squirrel-cage motors have good characteristics. At 1200 rpm or less and 100 hp or above synchronous motors preferred account power factor and efficiency.	Dripproof.
Fan Pumps	Magnetic drive & synchronous motor	Fan pumps are usually quite large and operate at low controllable speed. For accurate head control a synchronous motor plus magnetic drive should be used.	Dripproof.
Compressors & Vacuum Pumps	Synchronous	Reciprocating compressors, if over 100 hp, should be direct connected to synchronous motors. High speed compressors, or, if rating below 100 hp, may be squirrel-cage motor driven.	Open if direct-connected synchronous motor. Drip proof if squirrel-cage.
Fans	Magnetic drive & synchronous if 100 hp or larger	Fans requiring variable output are accurately controlled by magnetic drives. Motor should be synchronous if 100 hp or larger.	Dripproof.

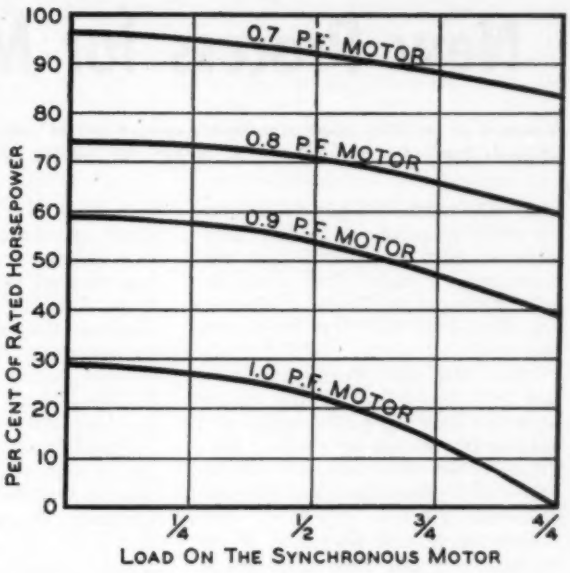
general classes. One protects the motor against falling or splashing liquids, or falling particles; the second serves to remove the heated air discharged by the motor.

Motors exposed to falling and splashing liquids, or installed in locations where floors may be hosed, should be *splashproof*. This would apply to motors driving beaters, jordans, refiners, pulpers, stock pumps, etc.

Any high speed belted motors; also coupled motors driving motor generator sets, fans, hogs or similar loads should be *dripproof*.

Low speed motors, such as might be employed to drive grinders, chippers or air compressors are normally built open type. This is usually satisfactory from the standpoint of protection from mechanical injury. However, a grinder room with 20,000 installed horsepower must dissipate, at full load, 600 kw in losses continuously. This generally makes it desirable that the motors be semienclosed and be provided with air duct discharge connections. The motors will then draw their cooling air from the room and discharge it outside to prevent undue heating of the motor room.

Fig. 3—Curves at the right show the leading reactive kv-a (kv-ar) in per cent of thermated horsepower of the motor, that will be supplied at various loads by synchronous motors of various leading pf ratings. Example: At half load, a 100-hp 0.8 pf synchronous motor will deliver leading reactive kv-a equal to (see curve) approximately 72% of its horsepower rating, or 72 leading kv-ar



Progress at Thilmany

(Continued from page 56)

as the existing boilers now operating.

Space requirements of the new boiler necessitated the removal of the old No. 3 and 4 boilers. Enlarging and renovating the building structure was necessary, and included raising the roof and extending the building to house some of the new equipment.

The new unit is a four-drum, bent-tube type boiler, complete with air heater and economizer. The auxiliary equipment included in the installation is a Detroit four-section, two-drive Roto Grate stoker; Ingersoll-Rand boiler feed pump, direct-connected to a Westinghouse steam turbine; Republic boiler control; Vulcan soot blowers; Swarthout excess pressure regulator; Lunkenheimer non-return valve; Consolidated top valve; Yarway blowoff valve and water column with remote level indicator; Copes feed water regulator; Western Precipitation Corporation flyash collector; Clarage forced and induced draft fan; Electric Machinery Manufacturing Company synchronous motor with magnetic coupling drive for the induced fan.

Complete new coal and ash handling equipment was installed. Stephens Adamson Company supplied the coal handling machinery. A new track hopper and crusher house is located in the coal storage yard. From here the coal is transferred to the top of the boiler house by a new 476-ft belt conveyor which discharges to any one of three bunkers. Continuous weighing scales made by Stock Engineering Company measures the fuel into conical non-segregating distributors which feed the stoker hoppers. A flexible control arrangement improves operation of the conveyor system and prevents over filling of the bunkers. Expensive handling of coal by yard cranes and railroad cars is now eliminated by the addition of this new belt conveyor.

Ash handling equipment includes a new tile hopper, air washer and dustless unloader made by the United Conveyor Corporation. The new ash handling system is equipped with push button control.

A new modern feed water treatment at the plant was designed by Sheppard Powell Company, Baltimore, Maryland. It is comprised of a hot process, lime soda softener and filters made by the Permutit Company and equipped with Proportioneer's chemical feeders and pumps. The system is arranged to deliver all condensate to the new boiler and all treated water to existing low pressure boilers. Feeding of the treated water to the new boiler at periods when sufficient condensate is unavailable is made possible by cross connections operated by either automatic or manual control.

Acknowledgment is made to C. R. Seaborne, vice president, Thilmany Pulp & Paper Company, for permission to publish this article, and to T. T. Collins, Jr., F. X. Kreiling, A. M. Schmalz, and Norm Zanzig for the help and co-operation that made this article possible.

New Process for Making White Liquor

A report on the pilot plant experiments carried out by Infilco, Inc., and Nekoosa-Edwards Paper Co. on an improved process for making sulphate cooking liquor.[1]

▶▶▶ EXPERIMENTAL WORK on the use of coagulants to aid the clarification of sulphate cooking liquor was described in a paper[2] given at the annual meeting of the Technical Association of the Pulp and Paper Industry in 1946.

Now, pilot plant studies have verified and carried further this earlier work and have led to the design of a commercial process by Infilco, Inc., Chicago. No new principles are involved; it is the combining of old principles that is new.

Coagulation and adsorption of impurities long have been employed in water treating practice, so it was only natural for Infilco to approach the problem of removing impurities from green liquor in this manner. The first of these investigations, green liquor clarification and the use of coagulants resulted in the finding that it was possible to clarify green liquor by the precipitation of magnesium hydroxide with the resultant removal of essentially all iron compounds prior to the causticizing operation.

Why Cleaner Liquors?

Need for cleaner cooking liquors has become more apparent as more kraft mills are moving toward production of more highly bleached papers. Most important is removal of iron which is responsible for the color for which green liquor is named. Presence of iron salts hinders the settling rate of causticized liquor. Most important is the fact that iron has a catalytic effect in furthering fiber degradation in the bleaching process. The effect is all out of proportion to the actual amount of iron present, since even small traces have a deteriorating effect. By removing iron from the cooking liquor and from the water used in bleaching, it is possible to produce super-bleached, high-brightness kraft with a minimum of fiber degradation.

Initial investigations were made by Infilco prior to 1946 on green liquor samples from Brunswick Pulp & Paper Company, Brunswick, Georgia, while mill trials were conducted at the National Container Corporation, Jacksonville, Florida. Laboratory tests gave relative coagulating properties of various chemicals employed, and those findings were confirmed by the mill tests.[2]

Following this work, pilot plant equipment was designed to investigate the process further. This was installed at the Nekoosa (Wis.) mill of the Nekoosa-Edwards Paper Company in 1948, and investigations were conducted to determine the effectiveness of the coagulating process and the equipment designed for this process. Further work carried on at the Bird Machine Company Hydraulic Laboratory, South Walpole, Massachusetts, was for the purpose of investigating the centrifugal separation of sludge from unclarified white liquor.

As a result of these studies, a commercial process has been developed. This process makes use of the floc forming ability of magnesium hydrate in the presence of alkali which accelerates settling of green liquor to produce clearer liquor at a faster rate than is normally accomplished. The magnesium hydrate, usually supplied in the form of epsom salts (magnesium sulphate), effectively coagulates green liquor to remove iron and reduce silica content. The combination of coagulating, causticizing, centrifuging, and clarifying into a unified process not only accelerates settling and produces cleaner liquors, but affords control over "hard to settle" sludges; it also results in cleaner sludges and lower soda losses.

The first phase of the pilot plant investigation was carried out by the Nekoosa-Edwards Paper Company at Nekoosa (Wis.) for the purpose of determining the effectiveness of the pilot plant clarifier when used with chemical coagulation of impurities in green liquor.

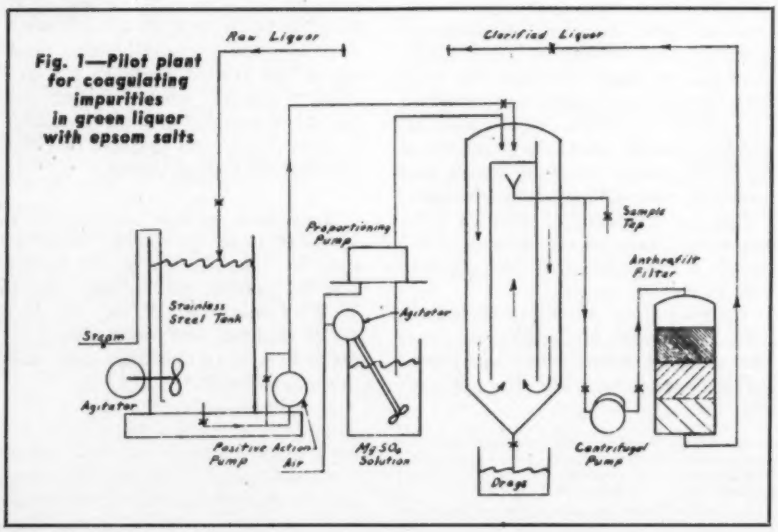


Fig. 1—Pilot plant for coagulating impurities in green liquor with epsom salts

Coagulation of Green Liquor

Epsom salt coagulation of impurities in green liquor is based on the principle of forming a magnesium hydrate floc by adding magnesium sulphate to raw green liquor in a vertical cylindrical draft-tube tank. This magnesium hydrate floc absorbs a major portion of the impurities present in the green liquor, such as iron, silica and suspended solids. This floc containing the bulk of undesirable impurities, then settles to the bottom of the tank as the liquor travels downward in the outside annular ring. When the slurry of floc and clarified liquor reaches the bottom of the tank, the floc settles out by virtue of its higher density and the centrifugal force caused by the sudden change in direction of the liquor, which then rises in the draft tube.

Clarified liquor, thus freed of the floc, is then decanted continuously off the top of the center draft tube and passed through an anthracite filter to remove any remaining suspended solids. The floc, or dregs, are removed from the conical bottom of the tank. As these dregs are associated with full strength green liquor, they are washed twice in the same type of unit but are not treated further with epsom salts.

A number of experimental runs were conducted with the pilot plant illus-

(1) Abridged largely from two Nekoosa-Edwards Paper Company reports prepared by R. E. Bringman, chemical engineer, et al, under the direction of Dr. T. A. Pascoe, technical director of this company, and from a bulletin entitled "Accelerated Chemical Causticizing," by J. M. Kahn, field engineer, Infilco, Inc., Chicago, Ill.

(2) E. G. Kominek and J. M. Kahn, Infilco, Inc., Technical Association Paper (1946).

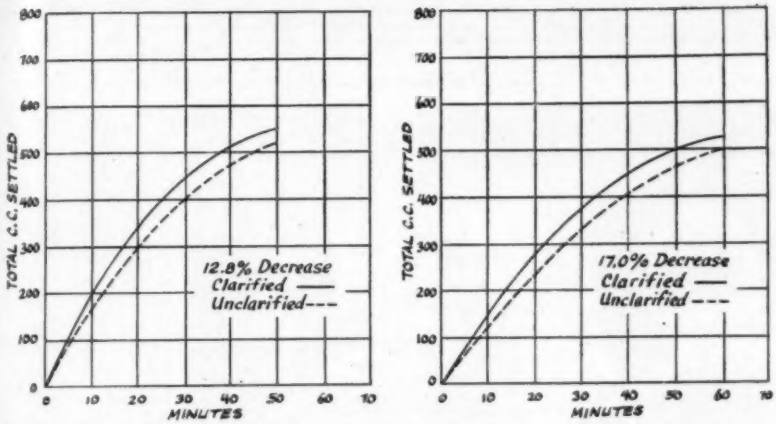


Fig. 2—Settling characteristics of clarified and unclarified green liquor, after causticizing. By the method of tangents the increased settling rates were found to be 12.8 and 17.0%, respectively

trated in Figure 1, and the results of two representative experiments are shown in Table 1. Five-hour continuous operation permitted the experiments to be carried out in an eight-hour day with time for preparation and clean-up. The pilot plant clarifier was rated at one gallon per minute per square foot of area of the draft tube. Addition of coagulant was maintained constant by a proportioning device. Discharge of clarified liquor was checked every fifteen minutes and a sample of the raw liquor, dregs and clarified liquor before and after the filter was also collected. The dregs collected were saved for washing. The liquor samples were tested so as to give clarification data. Samples of the clarified and raw liquors were causticized, and the relative settling rates determined. Samples of the dregs from the first and second washings were also collected so as to determine washing efficiencies.

Since the dregs washer is similar in design, the clarifier was used both for clarification and for dregs washing. Dregs washers are required to be only half the size of the clarifier so the rate of flow through the dregs washer was increased accordingly to 1.5 gpm. Filtration was employed to remove any residuals of suspended matter.

The results listed in Table 1 represent two complete clarification runs. The first run was made with an epsom salt addition of 1.50 pounds per ton of pulp production, while No. 2 represents the use of 1.23 pounds of epsom salts per ton. This lowering of the epsom salts charge was a method of correcting delayed floccing experienced in the first run.

From Table 1 and Figure 2 it can be seen that coagulation by the addition of magnesium salts to green liquor not only accelerates the clarification processes, but also improves physical and chemical properties of both the mud and the liquor. The amount of coagulant is readily adjustable, so the entire process may be controlled to meet varying conditions.

Centrifugal Separation of Sludge

Object of the second phase of the pilot plant investigation was to determine the feasibility of centrifuging sludge from strong white liquor and weak wash liquor. This idea is not new and has been invesigated before. But it was not successful because it did not produce a clear liquor. However, once the effectiveness of the coagulation process was indicated, interest in centrifuging revived because coagulation provided an easy means for cleaning up the filtrate.

Centrifuging studies were carried out in the Bird Machine Company Hydraulic Laboratory where excellent facilities are available for such experimental work. Clarified green liquor, prepared in the pilot plant at Nekoosa, was shipped in iron barrels to South Walpole where it was treated as follows:

1) Causticizing: The liquor was causticized by bringing it to a temperature of about 80 C and then slaking a 5 per cent excess charge of lime in a small portion of this, and using the milk of lime slurry so formed to causticize the remaining liquor.

2) First centrifuge: The white liquor was separated from the sludge by passing it through a Bird continuous centrifuge at rates varying between 5 and 20 gpm. The cake from the centrifuge contained 65 per cent average solids.

3) Clarification of white liquor: The effluent from the centrifuge contained an average per cent solids of 0.071 per cent. This effluent was then treated with epsom salts (0.5 pounds per ton of pulp production), given an hour of retention time to permit flocculation, and then decanted off. The clear white liquor was passed through an anthracite filter.

4) Sludge washing: The sludge washing was done in two separate runs. The first run consisted of adding cold water at 22 C to approximately half the cake recovered from the first centrifuge. The remaining portion of cake was washed with hot water at 63C.

5) Second centrifuge: This procedure was varied from the first centrifuge in that the sludge cake in the centrifuge itself was washed by a spray carried on the centrifuge conveyor. This wash water was fed to the centrifuge at a rate of 13.6 pounds of water per pound of cake per minute. The water used was both hot and cold. This small spray gave considerable assistance in washing the cake, reducing the soda losses by more than 50 per cent over centrifuging without a spray.

Used in these studies was a small stainless steel centrifuge which consisted essentially of a conical screw conveyor carried inside a cylindrical bowl. The basic principle of its separating action is sedimentation by centrifugal force. The solids that settle out are continuously removed from the centrifuge by the screw conveyor which, in the laboratory installation, made 89 revolutions for 90 revolutions made by the bowl. The cake tends to build up in the discharge end of the bowl, due to the conical shape of the screw conveyor. This cake build up or "beach" gives a conical cross section to the bowl and causes the liquor or effluent to flow back down to the inlet end and discharge. After the cake has built up the "beach," any excess is conveyed out by the screw through the discharge ports.

The centrifuge was equipped with a control panel that continuously re-

TABLE 1—Summarized per cent removals of impurities from kraft green liquor by epsom salts flocculation and per cent reclamation of sodium salts by using a two-stage countercurrent dregs washing

Runs—	Total Iron (ppm)		Silica (ppm)		Total Sodium gms. Na_2O/Liter	
	1	2	1	2	1	2
Raw green liquor	30	38.8	958	1110		
Clarified green liquor	6.9	7.0	788	929		
Filtered & clarified g. l.	4.4	4.5	594	864		
Clarifier dregs					188	70.2
Dregs from first wash					6.12	3.75
Dregs from second wash					0.215	0.288
Average per cent removal	85.4	88.4	40.2	40.4	99.9	99.6

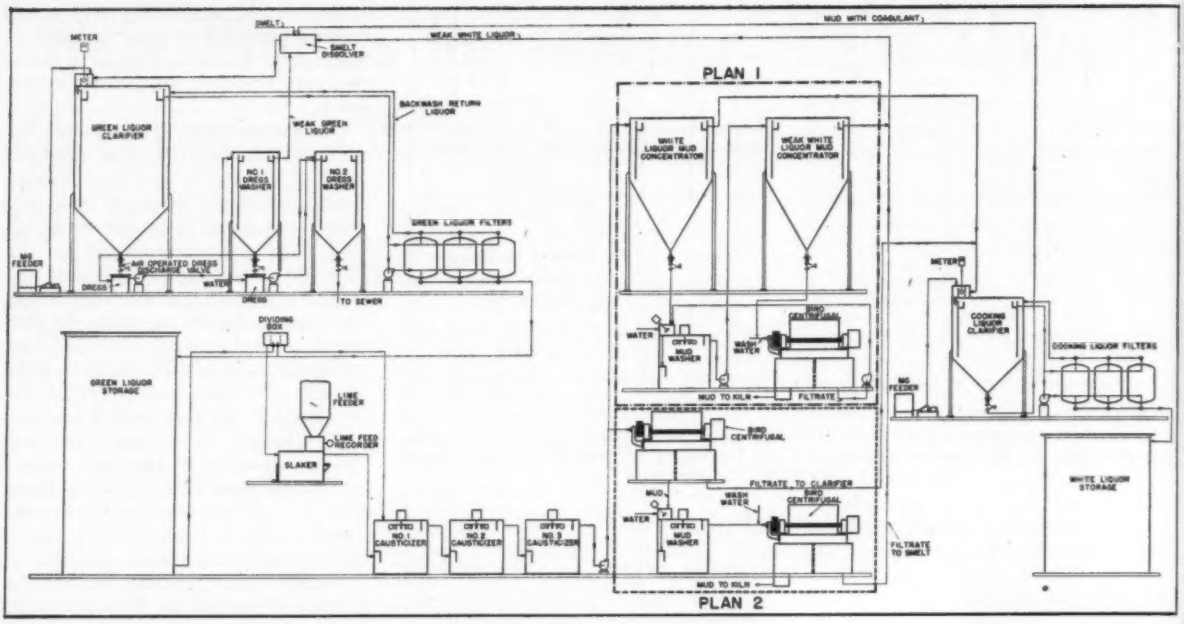


Fig. 3—Commercial plant for accelerated chemical causticizing of white liquor.

corded power input into the centrifuge, as well as horsepower required to convey the cake out. This device enabled the operators to determine load fluctuations caused by operational surges and to record these fluctuations on a pen chart recording device. This panel woud be an excellent aid in plant operation in that it would give a graphical indication of the production during each shift, and would tend to create more uniform operation of the system from one shift to the other.

Iron content of the final white liquor was found to be 2.5 ppm. This figure as it stands would represent good clarification when starting with 30-40 ppm of iron in the green liquor, but as shown in Table 2 the liquor sent to Bird picked up 37.5 ppm of iron after clarification, supposedly from the iron barrels. Had the clarified liquor contained 4-6 ppm of iron as was determined in previous runs, the final iron content would be negligible. Silica in the liquor was also low, indicating good removal (on the order of 40 per cent removal) despite the difficulty of removing such a material. Table 2 indicates that the sodium losses were cut appreciably by the operation of a spray wash in the centrifuge.

The sodium losses (Na_2O) experienced in operating a system of green liquor clarification and sludge separation by means of centrifuging are estimated from Tables 1 and 2 to be 0.5 pounds per ton of pulp lost in the dregs, and 5.0 pounds per ton of pulp lost in the sludge. Total sodium loss for the system is 5.5 pounds per ton.

With such complete removal of undesirable elements the resulting sludge cake itself was highly pure, making it suitable for use in making calcium bisulphite cooking liquor or for use as a filler or coating material. This is especially interesting to those mills that don't reburn the sludge to recover lime and to those that also operate sulphite pulp mills or make paper that requires the use of this type of filler or coating material.

Summary

Coagulation by the addition of a magnesium salt to both green and white liquors not only accelerates the clarification processes, but also improves physical and chemical properties of both muds and liquors.

This process allows the use of smaller settling tanks free from internal moving mechanisms wherein each step in the process takes place within a separate tank. Centrifugals may be used not only to dewater the final mud, but also to separate cooking liquor from strong mud, as clarification and mud removal are entirely distinct. Unit functions of the process may be incorporated in old conventional installation to operate with existing equipment to increase efficiencies and to improve resultant quality.

TABLE 2—Results from experiments on centrifuging sludge from white liquor

Run No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Material	A	A	A	A	A	A	B	B	C	C	D	E	E	D	F	G
Feed Tem. °C	97	97	97	97	95	93	22	22	22	22	63	63	63	63	22	80
GPM feed	4.83	7.72	8.40	13.8	11.8	20.6	9.48	4.96	20.0	13.1	10.0	16.0	13.3	5.2		
Per cent solids feed	10.6	10.6	10.3	10.3	10.3	10.3	10.4	10.4	10.4	10.4	10.1	10.1	10.1	10.1		
Per cent solids cake	67.0	66.3	66.5	66.6	66.6	65.0	63.5	64.2	60.0	62.0	66.0	63.7	63.5	67.0		
Per cent solids off	0.055	0.070	0.079	0.094	0.108	0.23	0.377	0.158	1.16	0.386	0.177	0.092	0.072	0.062	0.297	0
Lb per cu ft Na_2O effluent							1.90	1.605	0.538	0.667	0.736	0.569	0.562	0.596		
Lb Na_2O in sludge per ton pulp							1.53	12.6	4.76	5.69	5.51	4.55	4.53	4.33		
PPM iron off	20	20	20	10	10	10	10	5	20	22.5	20	2.5	2.5	2.5	37.5*	2.5
PPM silica off	259	315	1440		675		88		140	48	85	128	187	158		
Wash rate lb. per min.									13.6	13.6		13.6	13.6			
Wash temperature									20	20		60	60			

Key to Material Column given above:

(A) Centrifuge sludge from white liquor; (B) Centrifuge sludge from cold wash water; (C) Centrifuge sludge from cold wash water with centrifuge spray on using cold water; (D) Centrifuge sludge from hot wash water; (E) Centrifuge sludge from hot wash water with centrifuge spray on using hot water; (F*) Green liquor sent to Bird for this experiment (High iron content due to shipment and storage in iron barrels); (G) Final end product (white liquor)

PAPER SKETCHES

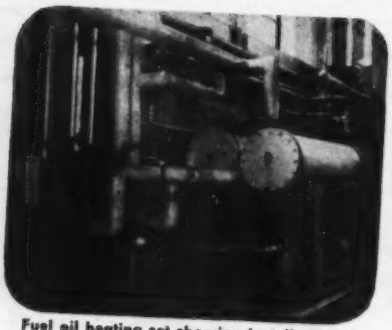
It WAS A CUSTOM IN MEDIEVAL PRINT SHOPS FOR THE COMPOSITORS AND PRESSMEN TO INSERT NEW PAPER WINDOWS IN THEIR SHOPS ONCE A YEAR—AROUND BARTHOLOMEWTIDE. AS A REWARD FOR THIS SERVICE, THE MASTER PRINTER INVITED THE MEN TO A FEAST WHICH HE HIMSELF STAGED.

IN NINETEENTH CENTURY ENGLAND, CATERERS FLAVORED AND SERVED AS FOOD THE SAME GELATIN USED BY PAPERMAKERS FOR SIZING!

ALTHOUGH THE BRITISH HOUSE OF COMMONS PASSED A LAW EXTENDING THE EXPIRING SEVEN-YEAR PATENT ON THE PAPERMAKING MACHINE IN 1807, THE HOUSE OF LORDS REJECTED IT BECAUSE IT WAS NOT AN ORIGINAL INVENTION OF THE FOURDRINIERS.

WHITE "BLACKBOARDS," MADE OF FIBRE BOARD, PASTER COATED AND BAKED, ARE BEING PRODUCED FOR MODERN SCHOOL ROOMS. A DRY CLOTH IS USED TO ERASE WRITING MADE BY THE DUSTLESS CRAYON PROVIDED.

Insulated steam mains and header fitted with Lunkenheimer Valves.



Fuel oil heating set showing installation of numerous small Lunkenheimer Valves.

Intake, check and discharge valves on a pump installation.

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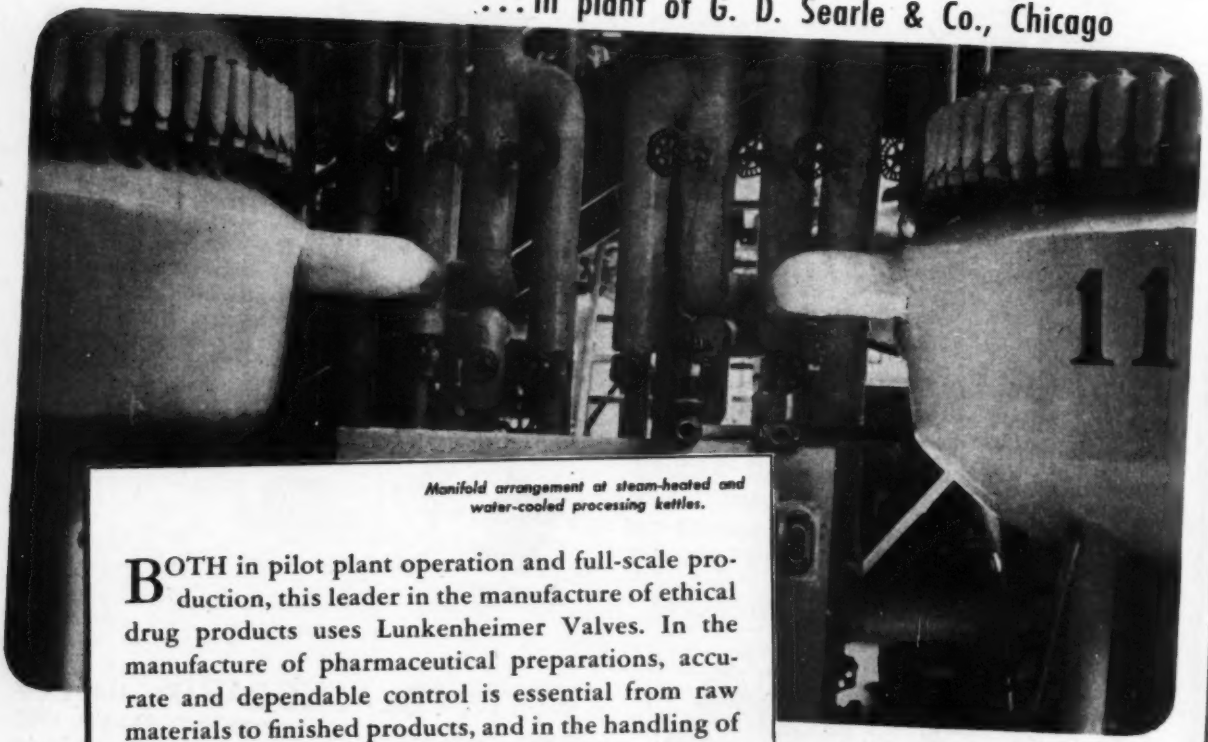
. . . in plant of G. D. Searle & Co., Chicago



Manifold arrangement at steam-heated and water-cooled processing kettles.

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Current Comment . . .

The opinions expressed here are from a commentator close to the industry, who, in the past, has interpreted briefly the trends of the paper industry. His comments, which hereafter will appear at greater length than before, and in broader scope, are based entirely on economic and financial facts that emanate regularly from sources that speak with authority.

FIRST QUARTER BUSINESS BRIGHTER THAN FORECAST

▶▶▶ THAT THE YEAR 1949 will not be one of depression has become evident as three months now have passed. Business men were alarmed by the November elections with a promise of a period of radical left-wing legislation which might work havoc with the American system of free enterprise. Sober second thought at Washington has to a large extent proved an encouraging factor. Some changed conditions, however, must be recognized as the outstanding developments of the first quarter year.

First—While business is maintaining a high level, in paper as well as in other fields, there is definitely a turn from last year's sellers market to a buyers opportunity. Those who have forgotten the art of selling are being forced to go to work hunting business, instead of merely approving deliveries to the more favored customers.

Second—In the paper field, certainly, and in other manufacturing lines probably, consumption is continuing at the high levels of 1948. The early months of the year seem to point definitely to a somewhat reduced production, but to no reduction in buying. The best forecasts for the paper industry are for a production not more than 10 per cent below the record levels of 1948. This 10 per cent drop is not due to a decreased demand, but to the fact that the surplus of production over consumption in 1948 was, as one outstanding figure has put it, the filling of the pipe lines of communication between the mill and the consumer.

Financially, the paper mills are not earning the high dividends of last year, but a lag of 10 per cent is anything but alarming—rather, an indication of stability. Production this year has been at about 90 per cent of capacity and it must not be forgotten that the present capacity is enormously greater than ten years ago.

With this optimistic outlook, it is appropriate to review the factors which have brought about this condition. No small part of the advantageous conditions is due to legislative developments in the nation's capital. The ultra-left legislative proposals by President Truman are definitely being smothered by a national recognition that private enterprise has rights. The President's program has failed, in large measure. Legislative action at least will be watered down greatly from the original administration demands. The Atlantic pact promises to do much to alleviate the fears of another war; it is being recognized as a potent force for future peace.

▶▶▶ At the moment, it seems certain that the enormously expensive proposals for social welfare which would increase the need for tax money, will fail in large measure. The attitude of the coal miners will serve to modify the demand for an extensive weakening of the Taft-Hartley labor act, the resentment at their attitude being certain to have repercussions in Congress. Legislation seems certain to modify the situation caused by the Federal Trade Commission's insistence on a new basing point system, which if carried out would work havoc in the paper industry. Pending scientific study, the legislation now being favorably considered would invalidate the Federal Trade Commission's rulings for a moratorium period in which present methods of absorption of freight charges could continue.

▶▶▶ Legislative sentiment, as shown by the action on the housing control, is to eliminate the dictatorial powers already possessed by the executive, and it is unlikely that any new such powers will be granted.

▶▶▶ The administration proposals for continued autocratic control over tariff rates through Reciprocal Trade Agreements are questioned by some of the administration leaders, and if granted will be voted by a narrow majority in the Senate.

▶▶▶ These are among the factors which have calmed the fears of business. Meanwhile, the paper industry and other industries as well, recognize that the problem of the day is salesmanship. Some price reductions have been reported, but the greatest changes in salesmanship have been a willingness to step up qualities and services to customers, and a willingness to produce special types of papers desired by the public.

▶▶▶ One item of current interest is the effort of the Post Office Department to increase postal rates. This effort is being combatted by the newspaper and magazine publishers, and Cola G. Parker, president of the American Paper and Pulp Association, appeared before a Congressional committee to express the belief of his industry that such an increase would decrease advertising, which in turn would materially affect the distribution of all kinds of merchandise.

▶▶▶ Senator Capehart's special committee which has been studying the newsprint shortage has made a final report indicating a belief that the development of a newsprint industry in Alaska is remote, and that a greater field for such production exists in the southern states.

▼

FINANCIAL

▶▶▶ PAPER MILL securities showed no marked changes in values during March, fluctuating slightly with the uncertain trend of current stock markets. The trend, if anything, was slightly upward.

American Writing Paper Corporation—Net loss for the year ended December 31 was $49,692 as compared with a profit in 1947 of $574,490.

A.P.W. Products Company—Net income for the year ended December 31 was $170,699 as compared with $289,297 for the previous year.

Celotex Corporation—Net income for three months ended December 31 was $455,630 as compared with $1,791,056 for the same period a year ago.

Certain-teed Products—Net earnings for twelve months ended December 31 were $6,599,907 as compared with $6,149,720 for the previous year.

Clopay Corporation—Net income for the year ended December 31 was $600,672 as compared with $811,488 for the previous year.

Container Corporation of America—Net income for the year ended December 31 was $10,424,593 as compared with $10,273,603 for the previous year.

Continental Can Company, Inc.—Net income for the year ended December 31 was $14,811,562 as compared with $12,809,543 for the previous year.

Dixie Cup Company—Net income for the year ended December 31 was $1,805,068 as compared with $1,638,193 the previous year.

Eastern Corporation—Net income for the year ended December 31 was $1,626,000 as compared with $1,717,000 the previous year.

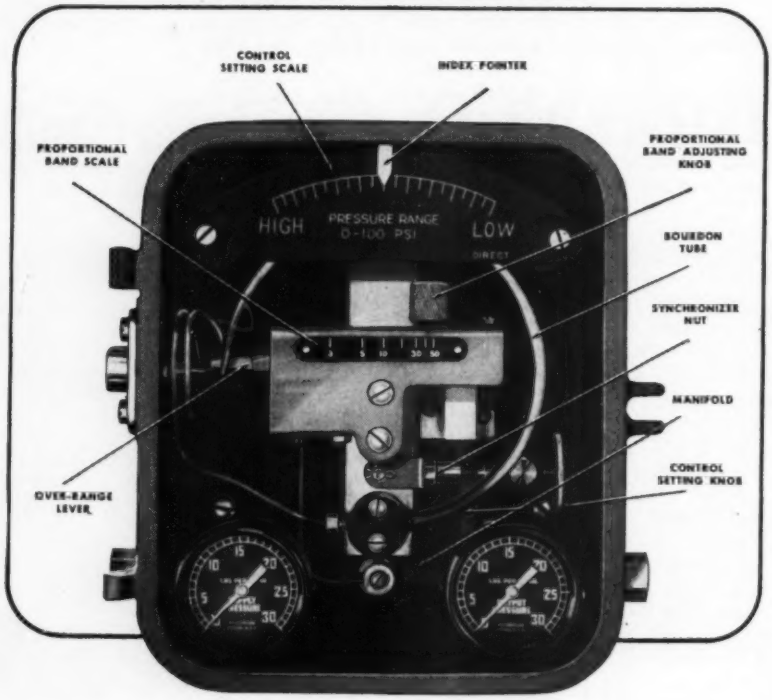
Eaton Paper Corporation—Net income for the year ended December 31 was $207,073 as compared with $312,381 the previous year.

Eddy Paper Corporation—Net income in

Announcing

No. 2700 Pressure Controllers

Providing Precise Response and Proportional Control at Moderate Cost



These controllers are designed for many industrial applications requiring accurate control where more expensive instruments are not warranted.

Applications include, among many others, pump governors, steam pressure reducing stations, gas well pressure reduction, etc., requiring small to intermediate proportional band.

The case is rugged and suitable for outdoor service; it is so designed that it may be mounted on the valve (on integral pad or by means of a U-clamp) or, *if the occasion arises, it may be removed from the valve and mounted on a wall.* A flush type case is also available for panel mounting.

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1948 was $4,388,432 as compared with $3,768,951 in 1947.

Fraser Companies—Net income for year ended December 31 was $5,599,748 as compared with $3,981,356 a year ago.

Gair, Robert, Company, Inc.—Net earnings for the year ended December 31 were $5,103,058 as compared with $6,010,438 the previous year.

Gaylord Container Corporation—Net income for the year ended December 31 was $8,015,000 as compared with $9,520,000 a year ago.

P. H. Glatfelter Company—Net income for the year ended December 31 was $625,972 as compared with $552,106 the previous year.

Hinde & Dauch Paper Company—Net income for the year ended December 31 was $3,991,929 as compared with $3,909,386 the previous year.

Hollingsworth & Whitney Company—Net income for the year ended December 31 was $3,570,355 as compared with $1,905,788 the previous year.

International Paper Company—Net income for the year ended December 31 was $60,489,266 as compared with $54,396,550 for the previous year.

Kimberly-Clark Corporation—Net income for the year ended December 31 was $7,529,845 as compared with $6,431,580 a year ago.

Marathon Corporation—Net income for three months ended January 31 was $1,180,045 as compared with $1,212,840 for the comparable period a year ago.

Masonite Corporation—Net earnings for three months ended February 23 were $1,146,167 as compared with $1,798,139 for the same period a year ago.

Minnesota & Ontario Paper Company—Net income for the year ended December 31 was $6,165,740 as compared with $5,753,359 the previous year.

National Container Corporation—Net income for the year ended December 31 was $6,184,953 as compared with $10,913,358 in the previous year.

National Vulcanized Fibre Company—Net income for the year ended December 31 was $1,321,967 as compared with $1,554,647 in the previous year.

Nekoosa-Edwards Paper Company—Net income for the year ended December 31 was $2,357,280 as compared with $2,663,631 the previous year.

Oswego Falls Corporation—Net income for the year ended December 31 was $1,065,057 as compared with $1,024,504 the previous year.

Oxford Paper Company—Net income for the year ended December 31 was $1,855,075 as compared with $2,920,906 a year ago.

Puget Sound Pulp & Timber Company—Net profit for 1948 was $5,513,626 as against $4,822,432 in 1947.

Rayonier, Inc.—Net income for year ended December 31 was $10,287,045 as compared with $8,505,916 for the previous year.

St. Croix Paper Company—Net income for the year ended December 31 was $689,846 as compared with $834,302 for 1947.

St. Regis Paper Company—Net income for the year ended December 31 was $14,859,802 as compared with $14,631,325 in the previous year.

Scott Paper Company—Net income for year ended December 31 was $3,899,179 as

compared with $2,856,350 for the previous year.

Soundview Pulp Company—Net income for the year ended December 31 was $6,149,888 as compared with $6,611,072 a year ago.

Union Bag & Paper Corporation—Net income for the year ended December 31 was $13,607,790 as compared with $1,756,608 a year ago.

United Board & Carton Corporation—Net loss for thirty-six weeks ended February 5 was $23,026 as compared with a profit of $990,762 for the comparable period a year ago.

United States Envelope Company—Net profit for the year ended December 31 was $758,027 as compared with $1,085,766 the previous year.

Upson Company—Net profit for year ended December 31 was $590,413 as compared with $470,316 for the previous year.

Paper Mill Corporate Changes

Hollingsworth & Whitney Company—A new issue of securities was completely sold within twenty-four hours of its offering. The company marketed $8,500,000 of 3¼ per cent debentures, together with 61,500 additional shares of nonpar value common stock. The funds are to be used for expansions under way or contemplated to increase its pulp production 50 percent. The additional expansion is expected to cost about $10,500,000.

Marcellus Falls Paper Mills—The company has been sold to a newly organized Glens Falls, N.Y., company, the Emperior Pulp & Paper Company, headed by Harold Yanklowitz of Glens Falls. The old plant is being overhauled for the production of specialty wrapping papers.

New York Stock Exchange—Stocks

	Closing Prices Mar. 25, 1949	Feb. 25, 1949
A.P.W. Products	*3⅝-4⅛	*3⅜-3⅞
Celotex	21⅜	21⅜
Same Preferred	19	*17¼-17¾
Certain-teed Products	12	11⅞
Champion P & F Co.	21⅝	22
Same Preferred	*94-96	*96-97
Chesapeake Corp.	20⅝	*22½-23½
Container Corp.	33	33⅛
Same Preferred	*96-97	97
Continental Diamond	8⅜	8⅝
Crown Zellerbach	25⅜	24½
Same Preferred	*96-97	95⅝
Same $4 Preferred	*94-95	*94-97
Dixie Vortex	*25¼-27¼	25½
Same "A"	*50¼-51½	49
Eastern Corp.	13	*11¼-12
Robert Gair	6⅛	6⅛
Same Preferred	16⅝	*16⅜-16⅝
Gaylord Container	19⅞	19¾
International Paper	48⅝	45⅝
Same Preferred	*98-99	*95¼-97⅛
Kimberly-Clark	20¼	19⅝
Same Preferred	*98-99	*96½-97¼
McAndrews & Forbes	*33¼-33¾	32
Marathon	20¼	19⅛
Masonite	50	49
Mead Corp.	15¼	*16-16¼
Same Preferred	76¾	*75¼-76½
Same 2nd Preferred	30⅝	*30½-31
National Container	7¼	7¼
Paraffine Co.	17¼	*17¼-18⅜
Same Preferred	*102¼-103½	104
Rayonier	26⅛	26⅝
Same Preferred	32⅝	*32-33
Scott Paper	*48¾-49	47½
Same Preferred	*93-95	93½
St. Regis	8⅛	7⅞
Same Preferred	*82¼-84	83½
Sutherland Paper	*31¼-32¾	32
Union Bag & Paper	28⅝	28¼
United Bd & Carton	5⅞	5⅞
United Wall Paper	3¼	3¼
U.S. Gypsum	99½	98⅜
Same Preferred	*179¾-181½	177½
West Va P & P Co.	38	40¼
Same Preferred	*105-105¾	*105¼-106½

New York Stock Exchange—Bonds

A.P.W. Products 5%	86	91⅞
Celotex 3¼%	101½	101½-102
Champion P & F Co 3%	100¼	100¼
Mead Corp 3%	102½	*102½-103

New York Curb Exchange—Stocks

Am Writing	5¼	5¼
Great Northern	38¼	38¼
Taggart	—	11

*Closing Bid and Asked Prices

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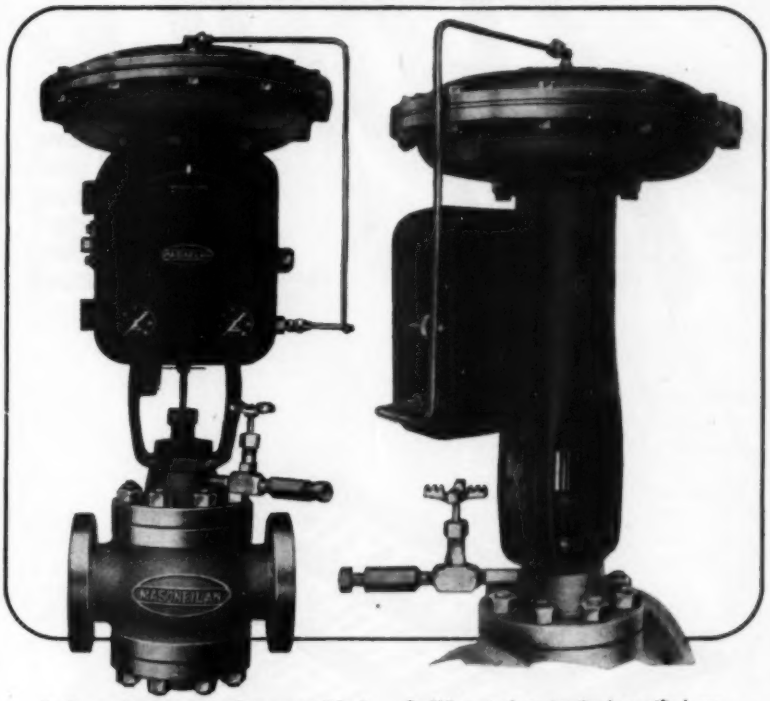

1. Pneumatic proportionality accomplished with feed-back bellows and cantilever leaf spring.
2. Direct nozzle and flapper pilot with metering restriction.
3. Large powerful bourdon tube for greater response and control performance.
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5. Wide selection of pressure ranges.
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8. When steel construction is specified, controlled pressure connection, tubing to bourdon tube and entire bourdon tube assembly, are supplied with Type 316 Stainless Steel, in order to avoid corrosive effects.
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APPLETON WOOLEN MILLS - APPLETON, WIS.

Thirty-first Annual Meeting of

Canadian Woodlands Section

▸▸▸ THE WOODLANDS Section of the Canadian Pulp and Paper Association held its thirty-first annual meeting at the Mount Royal Hotel, in Montreal, Canada, March 23 to 25.

Registration of approximately 700 visitors from all over Canada, from Halifax to Vancouver, Northern Quebec, Northern Ontario, from Newfoundland, the United States, even a visitor from Finland, proved the tremendous interest of pulp and paper executives and technical personnel. Exhibits included machinery, trucks, tractors, power saws, tools, and all kinds of equipment and descriptive literature.

Packed Program Opened with Annual Luncheon

Charles A. Gillett, managing director of American Forest Products Industries, Inc., Washington, D.C., guest speaker at the luncheon, pointed out that "nothing is more important to our wood-using industries than an adequate and stable supply of raw materials. Many other industries and thousands of forest-dependent communities are as vitally concerned. Our tree-growing lands have the capacity to meet our needs. Protection and management are the crux of the problem."

Mr. Gillett talked about the growing recognition of needs for reforestation, the program of the American Forest Products Industries and progress made along those lines since the AFPI instituted its first program seven years ago. He also stressed that the program was by no means limited to large holdings, but that reforestation is profitable also on a smaller scale, which includes the holdings of individual farmers.

One feature of the luncheon was the presentation of the J. A. Bothwell Award made to Edward Bonner, chief forester, Spruce Falls Power and Paper Company, Kapuskasing, Ontario, in recognition of his meritorious achievement on behalf of forest conservation in Canada. The award, which is donated by the Brompton Pulp & Paper Company, Nipigon, Ontario, was presented by J. H. Merrill, divisional woods manager of that company.

Officers Elected at Business Session

The afternoon of the first day began with a business session. Following the annual report of the chairman, J. W. Paterson, The E. B. Eddy Company, Hull, P.Q., there was an address by F. L. Mitchell, manager of the Canadian Pulp and Paper Association. Mr. Mitchell said that the pulp and paper industry's efforts have increased the Federal Government's more direct interest in forest operations, as well as the interest of the Canadian public. He concluded his remarks to the foresters by pointing out that they were not only working for themselves and their companies, but also for the people of Canada.

Amendment of by-laws was followed by election of Association officers. The nominations resulted in the re-election of J. W. Paterson, The E. B. Eddy Company, Hull, P.Q., as chairman; Gordon Godwin, The Ontario Paper Company, Ltd., Montreal, was again made vice chairman. W. A. E. Pepler, manager of the Woodlands Section, was re-elected and two new councillors were elected—J. H. Merrill, Brompton Pulp & Paper Company, Ltd., Nipigon, Ontario; and J. A. Michaud, Consolidated Paper Corporation, Grand 'Mere, Quebec.

W. A. E. Pepler

Silviculture Considered at First General Session

The first day's General Session took place in the afternoon under Forest Management Chairman, J. W. Paterson.

Edward Bonner, chief forester of the Spruce Falls Power and Paper Co., Ltd., Kapuskasing, Ontario, spoke on the Silvicultural Research Program of the company. Mr. Bonner said, that his company began operations of its clay belts forests on its limits in the James Bay watershed, in Northern Ontario, in 1928. It charted a forest management policy designed to keep its mill supplied with the necessary raw materials. A long range program of silvicultural research was an integral part of this policy. The company also established the policy of not cutting any forests less than 100 years old. Mr. Bonner's paper stressed the interest and concern in furthering silvicultural research by the Canadian pulp and paper industry which has adopted a forest policy of harvesting its timber limits to assure a perpetual yield.

M. B. Morison, division of timber management, Ontario department of lands and forests, Toronto, Ontario, talked on "Experiments in Forest Management," concluding, that "the Canadian pulp and paper industry has adopted and is implementing a forest policy to obtain a perpetual yield of pulpwood from its limits."

A. Koroleff, Pulp and Paper Research Institute of Canada, talked on "Forest Research." D. R. Stevens, Brompton Pulp & Paper Comany, Ltd., reported on "Photographing Cutover Areas." J. J. de Gryse, chief, Forest Insect Investigations Unit, spoke on "Forest Insect Control." Leif Holt, Pulp and Paper Research Institute of Canada, reported on "Progress in Silvicultural Research," and J. D. B. Harrison, Food and Agriculture Organization of the United Nations, gave a lecture on "Forestry in the Changing World."

The morning of the convention's second day, was devoted to the question of labor. General session, under chairman R. S. Armitage, discussed "Woods Labor and Training," with D. Dyer, Spruce Falls Power and Paper Company, Ltd., talking on "Foreman Training." M. R. Wilson, Canadian International Paper Company, discussed the "Role of Clerks in Personnel Relations," and W. A. E. Pepler, Woodlands Section manager, talked on "Labor Turnover."

System Needed to Measure Labor Turnover

Stressing the importance of reducing the currently rising turnover rate of labor, Mr. Pepler suggested that companies establish a system of measuring their labor turnover rate from season to season and from year to year, to segregate and evaluate the causes for men leaving their employ and to introduce corrective measures, as well as to make it the most important occupation in the lives of a greater proportion of the labor force, despite it being a temporary job."

Mechanized Woods Operations

The afternoon was given over to "Woods Operating," with Gordon Godwin chairman of the General Ses-

sion. The first speaker was W. A. E. Pepler, manager of the Woodlands Section, who reported on the "Present Status of Mechanization of Woods Operations in Canada," reading a paper, jointly prepared with B. J. McColl, mechanical engineer of the section. The paper stressed that mechanization offers a possible means of effecting cost reduction in the industry's woods operations. World wide demand for the industry's products made it necessary to crop distant woodlands. Labor costs have risen. To meet these increased hauling and labor costs, the industry is experimenting with mechanical equipment. While successful mechanization will be slow to mature, its fulfillment—the speaker said—can assure more stable production of the industry, especially in Eastern Canada."

A. D. Williscroft, Just Equipment & Supply Company, Ltd., reported on "Test of DW-10 Rubber-Tired Tractor Hauling Sleighs"; B. J. McColl, Woodlands Section, reported on "Trends of Truck Hauling Costs"; Lt. Col. C. E. Brown, Dept. of National Defense, spoke on "Portable Camps"; Hidola Levesque and G. E. La Mothe, Price Brothers & Company, Ltd., gave a "Report on Use of Mechanical Saw"; and C. Ross Silversides, Pulp and Paper Research Institute of Canada, talked on "Current Investigations on Pulpwood Holding Grounds." Moving pictures on logging also were shown.

The last day of the conference was reserved for group discussions on the three main topics of the convention. The papers, presented during the preceding two days were included in the discussions as well as other matters of interest to the group.

Allan Buell, Longlac Pulp & Paper Co., Ltd., was the chairman of the group discussion on "Woods Operating." "Woods Labor and Training" was discussed under the chairmanship of Wm. C. Harrison, Abitibi Power & Paper Company, Ltd., with comments by H. F. Irwin, Textile Industries Association. J. A. McNally, Brown Corporation, presided as chairman over the discussion of "Forest Management."

Paper Coating Discussed at Ohio Section of Tappi

▸▸▸ A PANEL discussion on coating featured the Ohio Div. of TAPPI meeting held March 10 in the Hotel Manchester, Middletown, Ohio. Olin W. Callighan of Edgar Brothers acted as moderator, and J. R. Simpson, Champion Paper and Fibre Company, and B. E. Sooy, Gardner-Richardson Company, acted as members of the panel.

Opening the meeting Mr. Callighan briefly reviewed the various types of machine coating and conversion coating operations from an historical point of view. He also numerated the developments and improvements in coating raw materials that were required with each step in the advancement of new and better coating equipment.

Preceding the discussion period, the two members of the panel spoke briefly:

In his talk Mr. Simpson described the typical installation of the Champion knife-edge machine coating process. He said that the coater is very simple, and consists of an applicator roll that revolves in a pan of the coating color, applying an excess amount to the paper, and using a knife-edge to remove the excess. At the present time there are 26 paper machines (other than those at the Champion mills) using the Champion type coater, and 14 others in process of installation.

Those present were warned by Mr. Sooy to be aware of two major dangers in regard to machine coating: First, the tendency to resist progress, and, second, complacency. He illustrated the latter by referring to a 1912 automobile advertisement which stated that the model presented was their "Farewell car," the result of 25 years experience, and that no better car would ever be built. The make of car was the Reo—no longer made.

Mr. Sooy said that the District of Columbia Paper Company patented a process in 1927 that was the forerunner of machine coating applications. They used an engraved roll to apply a pattern to the sheet, and did not develop this method any further to apply it to machine coating.

The three major coating methods in use today were named and briefly described by Mr. Sooy: (1) Champion process, whereby an excess of coating is applied and then doctored off, (2) Imprinting methods, whereby metered coating is deposited on imprinting rolls and thence to the paper, and (3) Air knife coater, whereby an excess of coating is applied and the excess blown off by an air knife. The John Waldron Syncroset coater is an example of the second method, and there are now four installations of the John Waldron air knife coater (the third method).

Following the remarks by members of the panel, questions were propounded and discussed:

1. Does machine coating slow down the machine very much?

Ted Sooy: No, unless you go to high coat weights.

2. What effect does machine coating have on the bending qualities of box board?

Ted Sooy: This depends on how heavy a coat weight is being applied. Thin coat weights are o.k. The type of process used is also a factor.

Jim Simpson: I agree with Ted; however, a coated board will usually crack on bending more than an uncoated one. The board furnish must also be considered.

Callighan: The degree of scoring has considerable influence on the cracking tendencies of box board.

E. K. Stilbert: The use of Rubber Latex as a coating adhesive or extender improves bending qualities of board.

O. R. Steffens: I agree with Jim and Ted. Certain modified starches and the use of plasticizers aid bending qualities of coated board.

3. What is the maximum number of coaters that have been installed on any one machine so far?

Jim Simpson: Two coaters; some will soon have three. This will give the sheet additional quality.

J. B. Chamberlain: We have more than two Champion type knife coaters on our machines.

4. Will coat weight change with change of draw?

Jim Simpson: Run sheet loose, more coat retained on sheet; tighten draw and more coat will be scrapped off. We find it best to run a snug draw or one gets a more pronounced coating pattern.

5. Have any mills quit *Off the machine* coating and gone to machine coating because it is of equal quality?

Jim Simpson: I know of two that have done so.

Harry Pedley: We went to machine coating kraft bag stock because of reduced labor and coating costs and improved flexibility, besides our conversion equipment was about ready to be replaced. It was worn out.

6. Can machine coating be applied on both sides of the sheet without drying between coats?

Callighan: Yes, one process applies the coating on both sides without drying each application.

7. Is it possible to make colored grades by any machine coating process?

Ted Sooy: It can be done if there is sufficient demand.

Harry Pedley: We have made a machine coated bag stock using Canary chrome pigment as the dye.

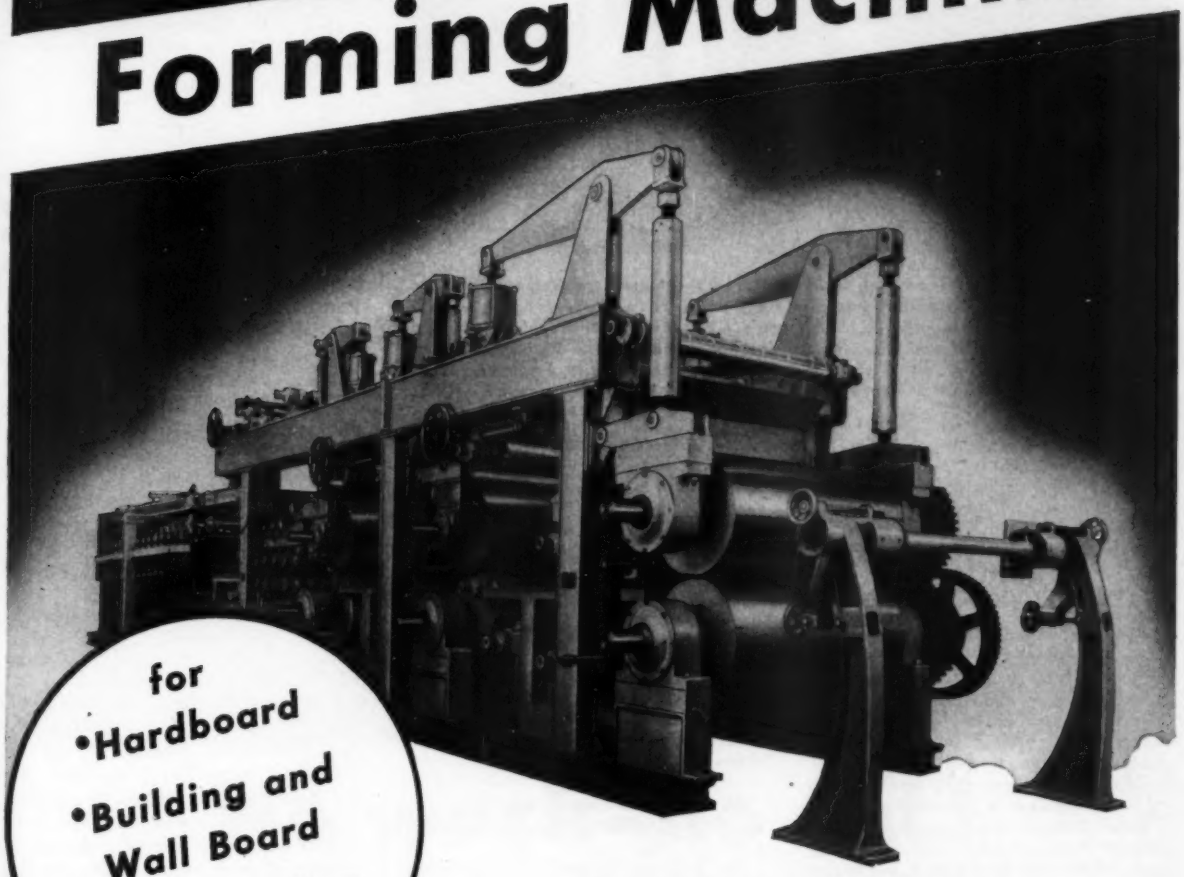
Jim Simpson: I have seen the difficult blue-grey coating color applied by machine coating with good results.

8. What types of adhesives are used in machine coating?

O. R. Steffens: Starches, casein, soybean protein, alpha protein, and latex + starch.

Elmer Stilbert: Casein + dextrin and starch + dextrin.

Sandy Hill Forming Machine



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Castings
Bleaching Equipment
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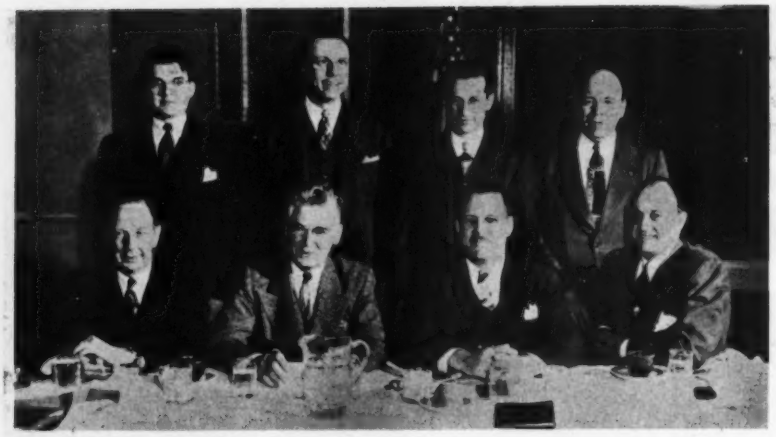
Cleveland Type Bearings
Shaker Screens



Participants in the Coating Panel, which featured the March meeting of Ohio Section of TAPPI, are shown with the Section's officers. Left to right—Front Row: S. R. Holmes, corresponding secretary; J. R. Simpson, Champion Paper & Fibre Co., and B. E. Sooy, Gardner-Richardson Co., who were panel members; Olin W. Callighan, Edgar Brothers Co., who acted as moderator. Back Row: H. A. Smith, recording secretary; Phil S. Cade, chairman; Arthur Thurn, vice chairman; and R. D. McCarron, treasurer.

9. Can all adhesives be adapted to all machine coating process?

Elmer Stilbert: Hard to say. Thixotropy comes into play when dealing with high solids color and this may limit the type of adhesive used.

N. R. Gotthoffer: A special low viscosity soybean protein coating color of 55% solids is being used.

Jim Simpson: In machine coating board, casein is the principal adhesive used because it can be easily water-proofed, and this is important because most boards are treated after coating at the calender with water boxes. Alpha protein works as well as casein in this respect. Starch can be water-proofed but it is more costly and of doubtful over-all end use at present.

Elmer Stilbert: Starch and latex as the adhesive have not been tried for coating board. Some may have tried it, but to date we have no information.

10. Is there any reason why an air brush coated card should blacken more than a brush coated sheet when calendered?

Ted Sooy: If the same coating color is used there will be no difference. The air brush may be superior in this respect because generally you don't have to calender it as much to get a smooth finish.

11. Is there any difference in the wax pick test of a brush coated sheet vs. air brush coated one?

Tom Luey: No difference.

Jim Simpson: As the run progresses the air brush coated sheet will have a lower pick test as the air brush classifies the clay particles, with a resultant build-up of the larger particles in the color and hence more of them staying on the sheet and consequently lower pick. Steps are being taken to correct this condition by using finer clays and better make-down methods.

12. How does best machine coating compare to best converted No. 1 Enamel? Halftones, etc.?

Jim Simpson: Machine coating on board is equal to off the machine coating as to printing results.

Callighan: The machine coated product of today will duplicate nearly every converted sheet excepting a No. 1 grade of book or Litho paper.

13. How many rolls in a Waldron Syncroset Coater?

Callighan: Generally speaking 2 or 3 trials must be made on different rolls before the correct type for a given sheet will be found. One roll with all conditions being known might pick up 3 pounds per side where 8 pounds are needed, therefore, a different roll is necessary.

14. What can be done to smooth the sheet prior to coating board, where the Champion process is used?

Jim Simpson: Type of rawstock means everything. Usually there is a set of smoothing rolls before the second set of coaters. These rolls are water cooled to prevent sticking, single nip, steel or chrome plated rolls. Pressure at nip up to 100 pounds per linear inch. Diameter of bottom roll 14 inches and top 12 inches. Moisture in sheet going to coater 40-45 per cent.

15. What is the moisture content in the sheet before machine coating?

Jim Simpson: In coating board, going to the first set of coaters—50-55 per cent dry; and going to second set of coaters—60-65 per cent dry.

Ted Sooy: In coating paper the sheet is dry, with only 5-6 per cent moisture.

Jim Simpson: In answer to a previous question, if the machine is operating at maximum drying capacity, and machine coating is installed, the first coater will slow down machine speed 3-5 per cent, and if a second coater is installed the overall speed will be slowed down 7-10 per cent.

16. Is blowing (the separation of the plys) a problem?

Ted Sooy: Yes, blowing is a problem but it has to be solved in the beater-room or at the jordans.

17. To install the Champion process do you have to remove any driers?

Jim Simpson: Usually not. On stack drier board machines the coater can be installed between the stacks. With three tier driers the bottom drier is removed. This gives room for a smoothing press prior to the coating application.

18. Has the Champion coater been used for other types of coating, for example, greaseproof sheet?

Jim Simpson: Yes.

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MAINE-N.H. TAPPI TO HOLD SPRING MEETING IN JUNE

The Maine-New Hampshire Section of TAPPI will hold its spring meeting this year at Wentworth-by-the-Sea, Portsmouth, New Hampshire, on Friday and Saturday, June 17 and 18. This is an ideal location for a TAPPI gathering. Located near Portsmouth on the island of New Castle, Wentworth-by-the-Sea has its own 9-hole golf course of over 3000 yards, an ocean water swimming pool, and a separate pool containing salt water heated to 72 Fahr.

The Saturday noon luncheon will be held on the shore and will be an old-fashioned clam bake (weather permitting).

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▶▶▶ THE LADIES will be entertained by the Michigan Division of The American Pulp and Paper Mill Superintendents Association, Inc., at a Buffet Dinner Dance at Hotel Harris, Kalamazoo, Michigan, on Saturday, May 7. Cocktails will be served in the Green Room preceding the dinner. As always, at these annual affairs, this portion of the program will be sponsored by the Allied Industries. Dinner will be at 8:00. A. William Riedel, president of the Gus Riedel and Son Company, Kalamazoo, will act as toastmaster. Dress is optional.

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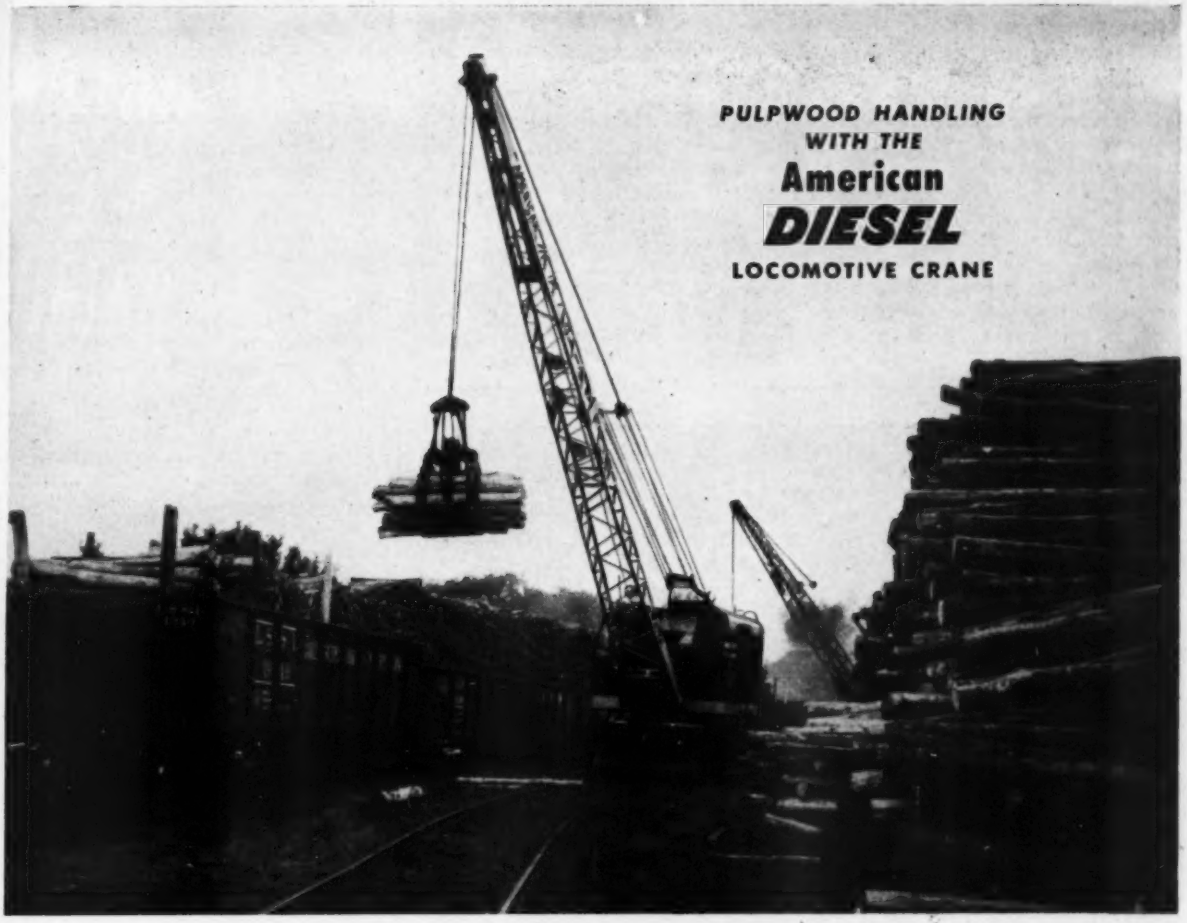
PAPER MACHINE FELTS WAS SUBJECT OF MARCH MEET OF MICH. SUPERINTENDENTS

At the dinner meeting of the Michigan Division of The American Pulp and Paper Mill Superintendents Association, Inc., held March 17 at Hotel Harris, Kalamazoo, Michigan, L. M. Woodside, Albany Felt Company, Albany, New York, was the guest speaker. His subject was "Felts and Their Relation to Paper Machine Problems."

Following the formal remarks of Mr. Woodside, there was a question and answer period that lasted for one and one-half hours.

Attendance at the meeting approximated eighty people.



No work-no eat!

If your pulpwood handling is now at the mercy of an old style steam crane, you'll find that the machine is doing a lot of eating when it should be working.

It's running in frequently for fuel and water. It's in the shop for a boiler washout. It's burning up coal early in the day, and perhaps all night, without moving a stick of wood. It eats up all the wages of a fireman, who does nothing but nurse the boiler.

Now—compare that with a new AMERICAN DIESEL, of the type shown here, in the yard of Consolidated Water Power & Paper Co. As to speed, smoothness and general efficiency, it outperforms the old steam cranes sensationally. It needs only one man. Its fuel cost is about one-tenth that of a steamer. When it stops work, all costs stop. It works tirelessly, week in, week out, without major servicing.

If the idea of "no work, no eat" appeals to you, why not let us give you some specific figures on the low operating costs of the AMERICAN DIESEL. As the first step, mail coupon below for new, illustrated catalog.

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CAN. TECHNICAL SECTION'S SUMMER MEETING TO BE HELD IN NIAGARA FALLS, ONT.

The summer meeting of the Technical Section of the Canadian Pulp and Paper Association will be held June 1, 2, and 3, at the General Brock Hotel in Niagara Falls, Ontario, with the Niagara Branch of the organization acting as hosts. This is in line with the present policy of programming summer meetings as official visits to its various branches. Such official visits to branches have previously been made on the East and West Coasts of Canada. The visit this year to the Niagara Branch will afford delegates an opportunity to tour mills in this large papermaking center.

All requests for hotel accommodations should be addressed directly to the manager of the hotel, with dates and times of arrival and departure stated. Some rooms at the Foxhead Inn have also been obtained, and may be reserved by writing the manager there.

A diversified program of technical papers and discussions will be scheduled, and organized visits will be made to some of the mills in the area during the meeting. In this area are mills producing a wide variety of products, including paperboard, newsprint, and specialty papers of all kinds.

Nonmembers are welcome to attend either the annual or summer meetings of the Technical Section, and every year an increasing number of visitors are welcomed to meetings. In the past few years, visitors from nearly all pulp and paper producing countries have attended.

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▶▶▶ AT ITS ANNUAL meeting in New York the United States Paper Exporters Council, Inc., elected Kenneth W. Lathan, vice president of Moller & Rothe, Inc., as president; George V. Johnson, vice president of Elof Hansson, Inc., was elected vice president; and Leon Bischoff, of Marquardt & Company, as secretary and treasurer.

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COMING EVENTS

May 7—Annual Ladies Night, Superintendents Ass'n, Michigan Division, Hotel Harris, Kalamazoo, Mich.

May 10-13—Eighteenth National Packaging Exposition, Public Auditorium, Atlantic City, N.J.

May 12-13—Instrument Society of America, Fourth Spring Meeting, Royal York Hotel, Toronto, Canada.

May 26—TAPPI (Delaware Valley Section), Engineer's Club, Philadelphia, Pa.

June 1-3—Canadian Pulp and Paper Ass'n, Technical Section, General Brock Hotel, Niagara Falls, Ontario.

June 8-9—General Management Conference, American Management Ass'n, New York City.

June 15-17—Annual convention of the Superintendents Association will be held at Chalfonte-Hadden Hall, Atlantic City, New Jersey.

June 17-18—TAPPI (Maine-New Hampshire Section), Wentworth-by-the-Sea, Portsmouth, New Hampshire.

June 17-18—Paper and Twine Ass'n, French Lick Springs, Indiana.

Sept. 11-15—TAPPI (National) General Fall Meeting, Multnomah Hotel, Portland, Ore.

Sept. 16—Conference of Northeastern Wood Utilization Council on Wallboards will be held in Cambridge, Mass., with the co-operation of Harvard University. Attendance limited to 75. Obtain invitations by writing E. L. Heermance, Sec., Northeastern Wood Utilization Council, New Haven 6, Conn.

Oct. 4-7—Society of Industrial Packaging and Materials Handling Engineers, Fourth Annual Exposition, Convention Hall, Detroit, Mich.

Oct. 25-28—National Safety Council, 1949 National Safety Congress, Chicago.

Oct. 31-Nov. 3—TAPPI, Engineers Conference, Statler Hotel, Boston, Mass.

Nov. 1-5—Pacific Chemical Exposition, California Section, American Chemical Society, Civic Auditorium, San Francisco, California.

Fishing is not all luck. It takes skill and the right tackle. Pressing paper is like that — and our business is to make the right tackle for you.

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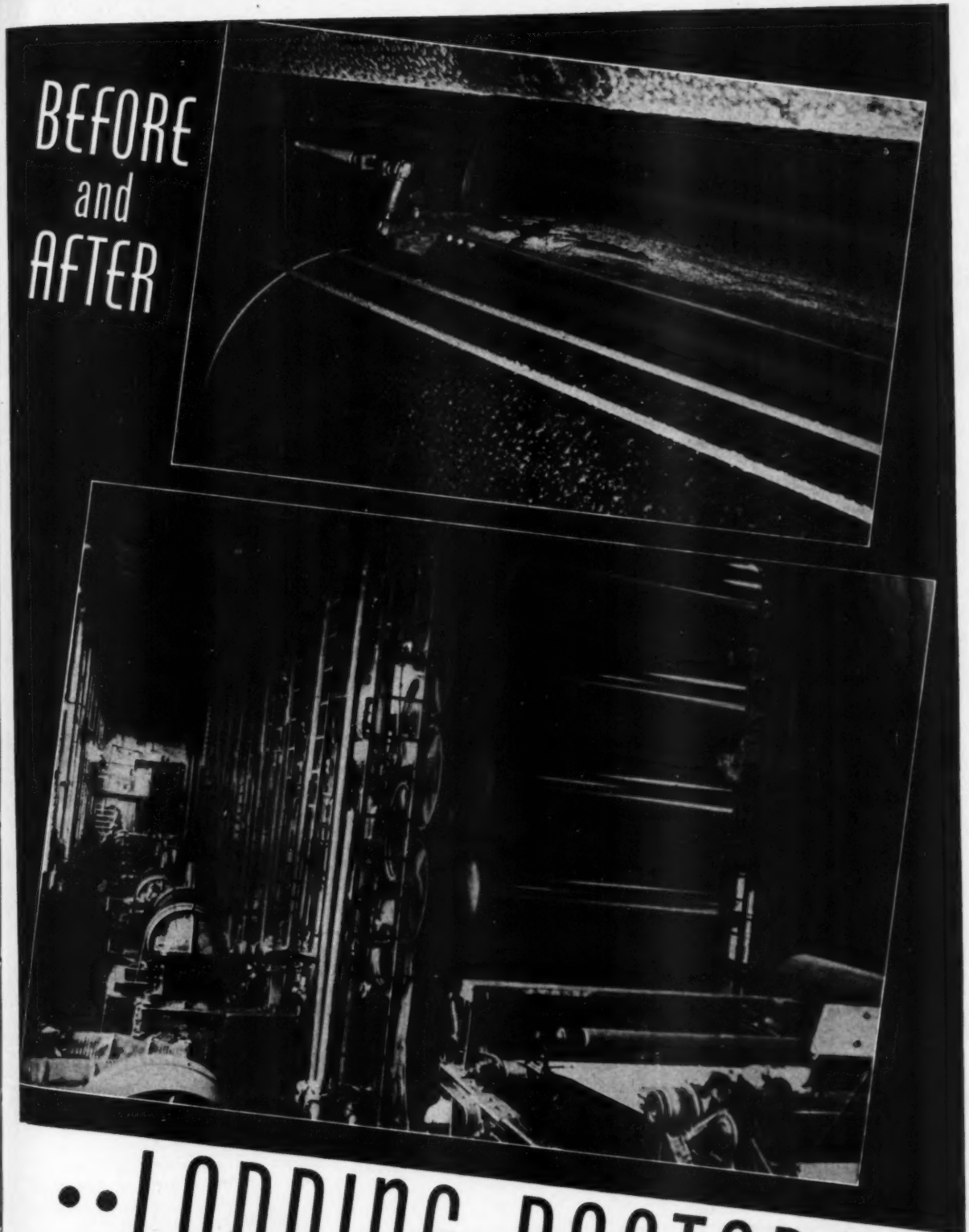
BEFORE
and
AFTER
••LODDING DOCTORS••

Allied . . . . . .

PUSEYJONES PAPER MACHINE SHIPPED TO SWITZERLAND

A high speed papermaking machine weighing 700 tons made by The Pusey and Jones Corporation, Wilmington, Delaware, was recently shipped to Switzerland in a Victory Ship built at the Puseyjones shipyards in 1942, and now leased to a Swedish shipping firm. Destined for the mill of Papierfabrik Utzenstorf in Utzenstorf, Switzerland, the machine will be unloaded in Rotterdam, then trans-shipped up the Rhine and by canal to Basel, Switzerland. From there it will proceed by rail a distance of approximately 40 miles to its ultimate destination.

The installation of the machine will be made soon after arrival, and paper production will commence in about two months.

The machine will be used for the manufacture of newsprint, catalogue, and other groundwood specialty papers at manufacturing speeds up to 1200 fpm. It is equipped with Puseyjones latest attachments, including flow spreader and 72 in high adjustable slice, fourdrinier part for wire 138 in wide, 75 ft long, equipped with Rapidrape wire changing arrangement, also suction couch; dual press with two suction rolls, also smoothing press arrangement all operated with air loading mechanism; dry part comprises 32 - 60 in dia paper and 6 - 60 in dia felt dryers, mounted in roller bearings and driven by means of enclosed gearing; one 8 roll stack of calenders with pneumatic loading; Pope improved reel and Puseyjones winder with roll handling mechanism. The machine will be driven by the latest type sectional motor drive, supplied by Brown Boveri Company of Switzerland.

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LIQUID CONDITIONING NOW A SUBSIDIARY OF COCHRANE

Substantially all of the capital stock of Liquid Conditioning Corporation, of Linden, New Jersey, has been acquired for cash by the Cochrane Corporation, Philadelphia, manufacturers of water conditioning equipment and steam specialties.

The newly acquired company manufactures a complete line of equipment for the conditioning of water and other liquids under the trade name, "Liquon." Hereafter, Liquid Conditioning Corporation will operate as a wholly owned subsidiary of Cochrane Corporation, the products of the former continuing to be marketed under the trade name, "Liquon."

According to T. E. McBride, president of Cochrane, the engineering, sales, and technical staffs of the two corporations will augment each other. S. B. Applebaum, one of the organizers and an officer of Liquid Conditioning Corporation, and considered an authority in the field of water conditioning, will be in charge of the cold water conditioning activities of both organizations, as well as the conditioning of liquids other than water.

"Liquon" district sales offices are combining operations with existing Cochrane sales offices.

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▶▶▶ FOR EXTRA PROTECTION against leakage and shaft scoring, new improvements have been made in Nettco Agitator Drives by the manufacturer, New England Tank & Tower Company, Everett, Massachusetts. Incorporating John Crane mechanical seals, the new design is said to eliminate leakage and protect products from contamination.

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TWO HYDRAFINERS ADDED BY BROWN AT BERLIN MILL

Installation of two additional Hydrafiners manufactured by the Dilts Machine Works of Fulton, New York, (division of The Black-Clawson Company) has been made by the Brown Company, Berlin, New Hampshire. The addition of these two units will make six Hydrafiners on this one paper machine, and a total of nineteen in the entire mill.

These latest installations should make possible the refining of additional stock for the company's new high-speed paper machine, "Mister Nibroc"—from which 110 to 125 tons of kraft toweling per day are expected, Brown Company officials said.

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▶▶▶ THE TEMPORARY branch plant opened at Ticonderoga, New York, in the summer of 1946 by F. C. Huyck & Sons, Rensselaer, New York, will discontinue operations June 30. Employees were notified March 9, and appreciation expressed by Huyck's President Francis H. Eldridge to the citizens of Ticonderoga for their wholehearted co-operation in the past three years. The Ticonderoga plant was opened in order to enable Huyck to complete a modernization and construction program (which will be completed this summer as originally scheduled) at its Rensselaer plant. The branch plant enabled Huyck to take care of excess production requirements in yarn rewinding and the mending and joining of papermakers felts.

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PRES. TRUMAN AWARDS CERTIFICATE OF MERIT TO A. O. SMITH CORP.

President of the A. O. Smith Corporation, William C. Heath, was recently presented with a Certificate of

Merit award from President Truman is presented by Maj. Gen. Paul L. Williams to Wm. C. Heath, president of A. O. Smith Corp.

Merit from President Truman. Presentation was made in Milwaukee by Maj. Gen. Paul L. Williams, commanding officer of the 10th Air Force. The award was made for work done by the company during the war in the development and production of welded hollow steel propeller blades.

In addition to the blades, A. O. Smith Corporation was a large producer of bombs, torpedo air flasks and landing gear for bombers. They made all of the B-29 landing gear.

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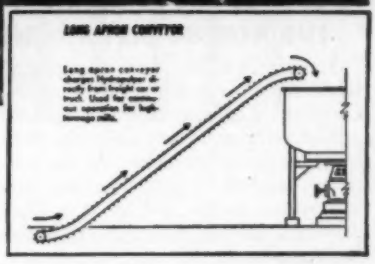
CALCO RESEARCH COMBINED

Consolidation of the Research, Process Development, and Dyes Technical Service of the Calco Chemical Division into a single department, to be known as the Research and Development Department, has been announced by the American Cyanamid Company, Bound Brook, New Jersey.

K. H. Klipstein, assistant general manager, Calco Chemical Division, in charge of the department, stated that "the growing need for better integration and co-ordination between Research, Process Development, and Technical Service, as a result of the company's expansion, necessitated the

Why a Conveyor to Serve a Hydrapulper?



It is logical to install a stock conveyor ahead of a Hydrapulper because . . .

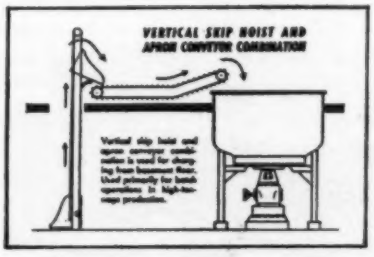
With a suitable conveyor, stock can be delivered fast enough to keep the Hydrapulper operating at capacity.

It is less costly to feed by conveyor than to do so manually.

Hydrapulper can be fed at a more regular rate and the consistency kept more uniform.

WHICH WILL SERVE YOU BEST?

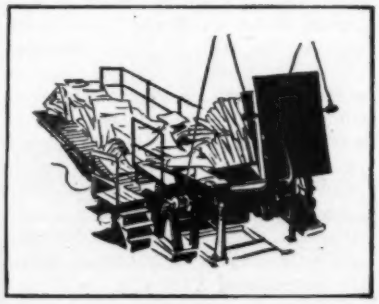
For batch operation the two-section conveyor is favored because the stock can be loaded onto the first section at the worker's convenience. A predetermined quantity can be dumped to and stored on the second section (at which time the wires are cut and removed) ready for charge into the tub the moment the batch ahead of it has been dumped.



When operating the Hydrapulper continuously a single-section conveyor is generally used, labor-saving and closer consistency control being the main benefits.

Where the mill layout forbids the use of a long conveyor, a skip hoist may be used with the Hydrapulper, either batch or continuous.

Help your Hydrapulper do the job it was built to do. Consult us on conveyors. *Request Bulletin No. 96-S.*



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consolidation." He pointed out that greater emphasis on improvement of quality as well as more effective utilization of the company's products would now be possible, and that a third important consideration was that the consolidation would permit the bringing together of specialized knowledge and skills without crossing departmental lines.

The assistant general manager also pointed out that the consolidation would not only benefit the company, but would open up greater opportunities for all individuals concerned as well.

Dr. H. Z. Lecher has been named director of research, Dr. Mario Scalera and Dr. R. P. Parker as assistant directors of research. Dr. R. H. Kienle and Dr. A. L. Peiker have been appointed, respectively, director and associate director of application research. (See "Names in the News" columns, this issue)

Dr. M. L. Crossley, under whose direction Calco's Research Department has been developed into an industrial research center, is retiring August, 1949. He will act as special consultant to S. C. Moody, general manager, and to the heads of the Research and Development Department.

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LANGSTON HAS MODERNIZED ENGINEERING DEPARTMENT

The enlargement of the Engineering Department of the Samuel M. Langston Company, Camden, New Jersey, now provides approximately twice the floor space previously available. At the same time, a modern fireproof concrete vault was added to file and store original drawings, bills of materials, engineering records, etc.

A modern illuminating system, using diffused fluorescent lights, was installed for the comfort of the employees, and the air-conditioning system was extended with the new addition.

Langston Company also recently enlarged its office and will shortly complete another addition to the factory, which will provide approximately 7500 sq. ft. additional manufacturing floor space, as well as rest room facilities.

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▶▶▶ A NEW PLANT, producing Prest-O-Lite acetylene at Albuquerque, New Mexico, has just begun operations, according to an announcement made by The Linde Air Products Company, a unit of Union Carbide and Carbon Corporation. This plant will supplement the facilities of an oxygen filling station, which (for about seven years) has provided industries in that area with a convenient source of Linde oxygen. A warehouse for the distribution of Union Carbide is also located on the plant premises.

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PAPER MILL MEN WILL SPEAK AT SPRING MEETING OF THE INSTRUMENT SOC. OF AM.

The fourth spring meeting of the Instrument Society of America will be held May 12 and 13 at the Royal York Hotel, Toronto, Canada. Among a large number of co-operating groups is the Canadian Pulp and Paper Association. The registration fee for members of ISA and of the co-operating societies is $2.00. Registration fee for non-members of these groups is $3.00. Pre-registration is urged, and those interested should write to Richard Rimbach, national secretary, Instrument Society of America, 1117 Wolfendale Street, Pittsburgh 12, Pennsylvania.

On the program is listed the following panel discussion: "Instrumentation in the Pulp and Paper Industry," Chairman: J. N. Franklin, Bowater's Newfoundland Pulp & Paper Mills Ltd., Corner Brook, Newfoundland. A paper on "Considerations in the Application of Instruments to Pulp and Paper Processes" will be presented by R. M. Brown, Stadler Hurter & Co., Ltd., Montreal, Quebec.

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▶▶▶ THE NEW BUILDING of Sun Chemical Corporation, located at 10th Street and 44th Avenue, Long Island City, New York, now houses the graphic arts group of the company, which is comprised of its printing ink and machinery divisions. This move, due to expansion, fills a need for centralization of Sun's operating and administrative functions.

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WESTINGHOUSE RECEIVES MOTOR ORDER FROM INDIA

Two 4,000-hp. motors to drive grinders capable of pulverizing four-foot lengths of wood have been ordered from the Westinghouse Electric Corporation, Pittsburgh, for India's new $8,000,000 National Newsprint & Paper Mills, in the Central Provinces. Power will be supplied by three Westinghouse 5,000 unit power plants, ordered last year by the government of the Central Provinces and Berar for a nearby power station.

The mill will utilize abundant local sources of long-fibered bamboo and short fibered salai trees for pulpwood, providing India with its first large-scale production of paper.

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▶▶▶ THE SALES ACTIVITIES of the American Brake Shoe Company are being expanded in Cleveland with the addition of the National Bearing Division. L. E. Hoyer and J. Robert Lottes, National Bearing sales representatives, will join representatives of the company's Brake Shoe and Castings, Southern Wheel, and Ramapo Ajax Divisions in the enlarged sales offices at 915 Midland Building. Their activities will be under the direction of James J. Nelson, eastern sales manager.

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▶▶▶ PURCHASE OF the last surplus property disposal center in Wisconsin, WAA warehouse 7, at Carrollville, by the Allis-Chalmers Manufacturing Company, Milwaukee, was announced recently. The property, which comprises 68.7 acres of land, will be used temporarily for warehouse purposes, and later will be converted to general manufacturing. Allis-Chalmers agreed to take the lake front property, six miles south of South Milwaukee, at a price in excess of $300,000. It cost the government $725,420.

Enlarged and modernized engineering department just completed by Samuel M. Langston Co.

Superior—

SURFACE COATINGS

ON INSULATION BOARD . . .

CALL FOR KELTEX

INSULATION BOARD coatings have uniform adhesive qualities and uniform surface density when you use KELTEX, the modern surface control agent. KELTEX keeps the coating on the surface and by control of selective absorption helps prevent the binder from being absorbed by the sheet faster than the pigment.

With KELTEX you also get even pigment distribution. By controlling pigment migration, KELTEX reduces any tendency toward mottling, thus giving uniform color and texture to the finished coating.

KELTEX is economical and easy to handle, soluble in hot or cold water and can be used in coatings applied from either the wet or dry end of the machine. Only a small amount is needed to give you consistently superior results.

The correct KELTEX formula for your insulation board can produce definite savings in coating costs. For details on its adaptability to your application, write to any one of our regional offices.

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Safety

APPA and Supts. Association Have Formed Joint Safety Committee

▶▶▶ A NEW MOVEMENT which unquestionably will be of great assistance in further expansion of accident prevention programs among paper mills has just become effective.

The American Paper and Pulp Association, in co-operation with the American Pulp and Paper Mill Superintendents Association, recently formed a Joint Safety Committee for the purpose of rendering assistance to mills in lowering the frequency and severity rates in the paper industry. Official announcement of this was sent to paper and pulp manufacturers by Cola G. Parker, president of APPA, on April 6.

This committee will not duplicate the efforts of the National Safety Council, but will co-operate with it. George W. Craigie, secretary-treasurer of the American Pulp and Paper Mill Superintendents Association, is secretary of this Joint Safety Committee. The Committee consists of the following:

George J. Adams (Chairman), Industrial Superintendent, International Paper Co.

E. G. Amos, secretary Industrial Relations Committee, American Paper and Pulp Association.

A. S. Anderson, asst. director General Ind. Relations, Champion Paper & Fibre Co.

A. R. Heron, vice president, Crown Zellerbach Corp.

O. W. Messner, production manager, Tarentum Products Corp.

C. H. Reese, vice president, Nekoosa-Edwards Paper Co.

G. K. Singletary, plant manager, Brunswick Pulp and Paper Co.

J. W. Towsen, vice president, West Virginia Pulp and Paper Co.

Geo. W. Craigie (Secretary), secretary-treasurer, American Pulp and Paper Mill Superintendents Association.

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TWO MILLS TIE FOR AWARD IN AWP SAFETY CONTEST

In the inter-divisional safety contest conducted by American Writing Paper Corporation, Holyoke, Massachusetts, two mills were declared co-winners for 1948.

The Albion Division worked 269,789 man-hours without a lost-time injury; the Mt. Tom Division worked 201,862 man-hours without a lost-time injury. The AWP contest resulted in 30 per cent fewer accidents during 1948 than in the previous year.

***PRESENTATION OF PLAQUE** to safety committee of Albion Division by Vice President E. C. Reid, of American Writing Paper Corporation. The company's Mt. Tom Division, which tied the Albion Division for award, received a similar plaque. Rear (L to R): J. Houlihan, J. Scanlon, T. Kirley, Mae Clark, F. Miska, J. Selden (Liberty Mutual); Front (L to R): A. Brunelle, E. C. Reid, W. Glidden, A. Girard, A. S. Wilson, M. Walsh, R. N.*

SAFETY PROGRAM OF H. K. FERGUSON CO. SAVED THE GOVERNMENT $200,000

Not a single fatality or serious accident has occurred during the building of the Nation's first peacetime atomic pile at Brookhaven National Laboratory, Upton, New York, since the project began in August, 1947, although 2,000 men were employed at peak periods. The successful safety program of The H. K. Ferguson Company, in charge of its engineering and building, has saved the government more than $200,000 in liability and compensation insurance costs. This saving represents money which will be returned to the government under terms of the insurance contract covering this project.

The Ferguson Company's accident severity, frequency, and motor vehicle rates were much lower than national averages. Out of 3,048,917 man hours worked in 1948, time was lost in only 21 accidents.

The company's frequency rate average was 6.89, while the national average for general building construction was 31.99, almost five times greater. The frequency rate is the number of time-lost accidents per million man hours of work.

The 1948 severity rate for the Brookhaven project was also much lower than the average, .08 compared with the national rate of 2.09. The severity rate is the number of days lost per thousand man-hours worked. Only 260 man days were lost from accidents during 1948.

Ferguson trucks used on the project had the lowest national accident rate in their class for the period June 30, 1947, to June 30, 1948; the company's busses had the lowest rate in their class; passenger cars had the fifth lowest rate.

This safety record was achieved despite the fact that much heavy construction equipment (including 50-ton capacity cranes) was used on the job.

A sound safety program and the co-operation of construction workers were credited by the company's safety director, John A. Sweeney, for the record. The program included:

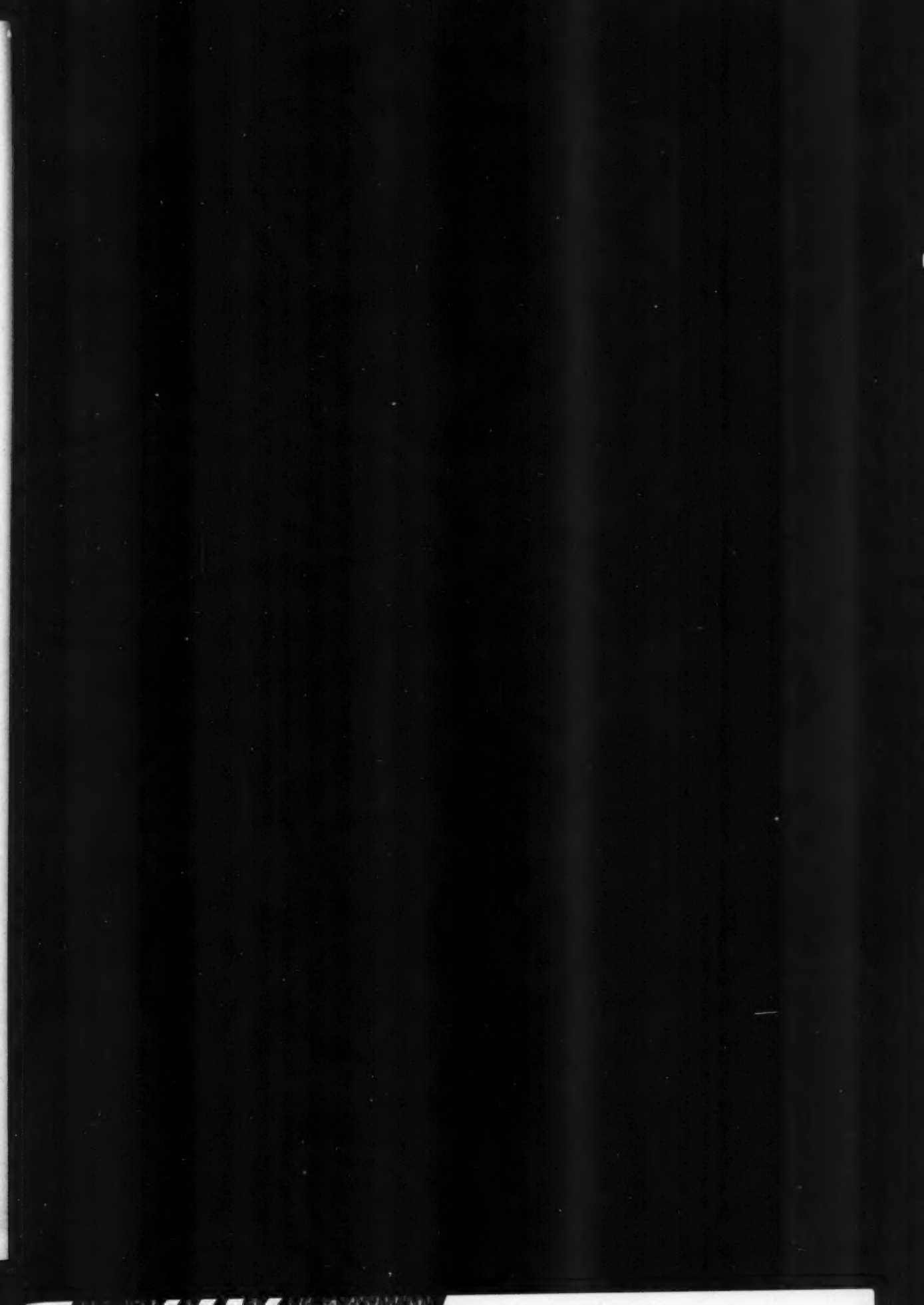
1. Devising safest construction methods with engineers and field workers in advance of actual work.

2. Regular field inspections to eliminate unsafe conditions and hazardous storage of materials.

3. Explaining safety measures to new workers.

4. Encouraging the use of protective equipment, such as construction helmets and steel-capped shoes with non-skid soles.

5. An incentive system in which crafts competed against one another for the best safety records; safety rec-



Pho
Fus

Why

No single type of dryer felt will meet the needs of all mills. But HOOPERWOOD "Canvas Engineering" has the answer to that problem—a specific HOOPERWOOD Dryer Felt for each requirement.

If it is a rugged, heavy felt you need for fine finish in normal production . . . or a lightweight, extra-porous felt for faster drying . . . or an Asbestos Felt to withstand advanced temperatures in high speed production of Kraft and other heavy papers—there is a HOOPERWOOD felt to fit your need.

Mill Superintendents find this service invaluable in suiting the particular requirements of their mill—even down to each machine position if desired.

Make your next felt *right*—specify HOOPERWOOD.

WM. E. HOOPER & SONS CO.

New York **PHILADELPHIA** Chicago

Mills: **WOODBERRY, BALTIMORE, MD.**

Engineered

Photo courtesy of the Fusey and Jones Corp.

HOOPERWOOD DRYER FELTS

COTTON AND ASBESTOS

ords were also considered in choosing foremen.

6. A well-staffed and well-equipped dispensary.

▼

CROSSETT SAFETY PLAQUE AWARDED POWER PLANT & RECOVERY RM. DEPARTMENT

For the top safety record among the departments of its company for 1948, the Power Plant and Recovery

Safety Plaque, awarded annually to winning department by Crossett Paper Mills, is surrendered by Pete Mizell (left), pulp mill superintendent, to Lonnie Gibbs, of the Power Plant & Recovery Room, 1948 winner. Russell Bell, Crossett's safety director, looks on

Room Department at the Crossett Paper Mills, Crossett, Arkansas, won from the Pulp Mill Department the inter-plant safety plaque.

The winning record showed 218,023 man-hours without a disabling injury and only 39 minor injuries. Altogether, the department has gone 19 months without a single disabling injury. Over the latter period, 314,701 man-hours were worked. The Pulp Mill Department was awarded the plaque just released for its safety record in 1947.

Lonnie L. Gibbs, superintendent of the Power Plant and Recovery Room, under whose supervision the winning department made its record, attributed the enviable safety record to three factors:

1—The safety meetings conducted monthly by the shift engineers wherein the men operating and the maintenance crews were instructed in safe working practices. In these meetings the men themselves brought out hazardous working conditions and unsafe working methods that they had noted.

2—The general cleanup campaign throughout the mill, which had special emphasis placed on it by the Power Plant and Recovery Room, also contributed to the record.

3—The partially completed expansion program of the paper mill which has given adequate boiler capacity, is credited with a large share of the successful record. Now that there is a margin available in power capacity, much effort can be expended by the maintenance crew toward eliminating unsafe conditions and equipment.

▼

▶▶▶ TOP HONORS in the annual accident prevention campaign sponsored by Associated Industries of New York State were awarded the following Buffalo area paper firms: Certain-teed Products Company, the Robert Gair Company, Inc., and the International Paper Company.

▼

SAFETY CAMPAIGN HEADED BY U. S. FOREST SERVICE WILL BENEFIT TAXPAYERS

According to a recent announcement an intensive accident and injury prevention campaign carried on by the Forest Service in the U. S. Department of Agriculture among its 23,000 employees during the three years 1946-48 paid off in a big way.

Final figures, released at the close of a meeting in Washington of Forest Service safety officers representing forest regions and experiment stations throughout the country, showed an 83 per cent drop in the number of deaths in line of duty, and a 25 per cent reduction in lost-time injuries in the calendar year 1948 as compared with 1947. About the same percentage drops were recorded when the 1948 record was compared with the average figures for the five years 1943-47.

In terms of money, the Forest Service said an estimated $589,000 was saved to the taxpayers in 1948 as a result of the campaign. The cost of lost-time and fatal accidents last year added up to $447,120, whereas the cost of such misfortunes in the five years 1943-47 averaged $1,066,358 per year.

On the basis of 30,205,435 hours of work done by Forest Service employees (approximately 11,000 permanent and 12,000 temporary or seasonal—in 1948), the total number of accidents was about 22 per million hours of work —a record low.

Certificates for outstanding achievement for the year 1948 were awarded to four of the 10 regions and six of the 12 stations by the Chief of the Forest Service, Lyle F. Watts, at the recent safety meeting. A special award was given the Medicine Bow National Forest in Wyoming for its outstanding record of 4½ years without a lost-time injury.

▼

SAFETY CONTEST SCORES

▶▶▶ THE FREQUENCY RATE for the 1948-1949 Contest touched another new low in February. The average frequency rate for all contestants in that month was 9.06 which was 4 per cent better than the previous best monthly rate of 9.46 in January, and was 23 per cent better than the average rate of 11.75 for the first seven months of the contest.

In February, the average rate for all of the contestants in the Paper Mills Division (Division I) was 8.87, the best recorded thus far in the present contest, and the principal reason for the lower overall rate. In contrast, the February rate for the plants in Division II was higher than the January rate, although still below the average for the first seven months of the contest.

Perfect scores for February were recorded by the following thirty-one contestants:

Division I—Paper and Pulp Mills

Group A (None)

Group B

West Virginia Pulp & Paper Co., Tyrone, Pa.

Group C

Price Bros. & Co., Ltd., Jonquiere, Que., Canada.
Spaulding Fibre Co., Inc., North Rochester, N.H.
Certain-teed Products Corp., York, Pa.

Group D

Hollingsworth & Whitney Co., Madison, Me.
Container Corp of America, Carthage, Ind.
Armstrong Cork Co., Pensacola, Fla.
Certain-teed Products, Richmond, Calif.
Mead Corp., (Wheelwright Div.), North Leominster, Mass.
Marathon Corp., Ashland, Wis.
National Gypsum Co., Kalamazoo, Mich.
Strathmore Paper Co., (Mill No. 1), Woronoco, Mass.
Container Corp. of America, (Calif. Container Div.), Los Angeles, Calif.
American Writing Paper Corp., (Albion Div.), Holyoke, Mass.
Fort Wayne Corrugated Paper Co., Vincennes, Ind.
International Paper Co., Livermore Falls, Maine.
National Gypsum Co., Newburgh, N.Y.
American Writing Paper Corp., (Mt. Tom Div.), Holyoke, Mass.
Kimberly-Clark Corp. of Canada, Ltd., Kapuskasing, Ont., Canada.

Division II—Paper and Board Remanufacturing

Group A (None)

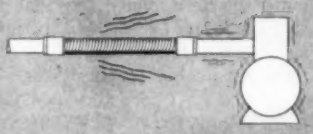
Group B

Canadian Cellucotton Products Co., Ltd., Niagara Falls, Ont., Canada.

Group C

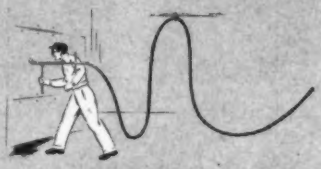
Kimberly-Clark Corp., Appleton, Wis.
Gaylord Container Corp., Atlanta, Ga.
Certain-teed Products, Dallas, Tex.
Marinette Paper Co., S. Glens Falls, N.Y.
Gaylord Container Corp., Tampa, Fla.
Pillsbury Mills, Inc., Wellsburg, West Va.
Thilmany Pulp & Paper Co., (Bag Mill), Kaukauna, Wis.
Research Products Corp., Madison, Wis.
Certain-teed Products, Buffalo, N.Y.
Flintkote Co., Hollywood, Calif.
ABC Corrugated Box Co., Minneapolis, Minn.
Bay West Paper Co., Green Bay, Wis.
Container Corp. of America, Atlanta, Ga.

*Other Services for CMH Flexible Metal Hose



VIBRATION

CMH Flexible Metal Hose absorbs vibration, isolating its damaging effects upon fixed structures.



MANUAL USE

For mobile service in conducting injurious media, CMH Flexible Metal Hose is the safe method.

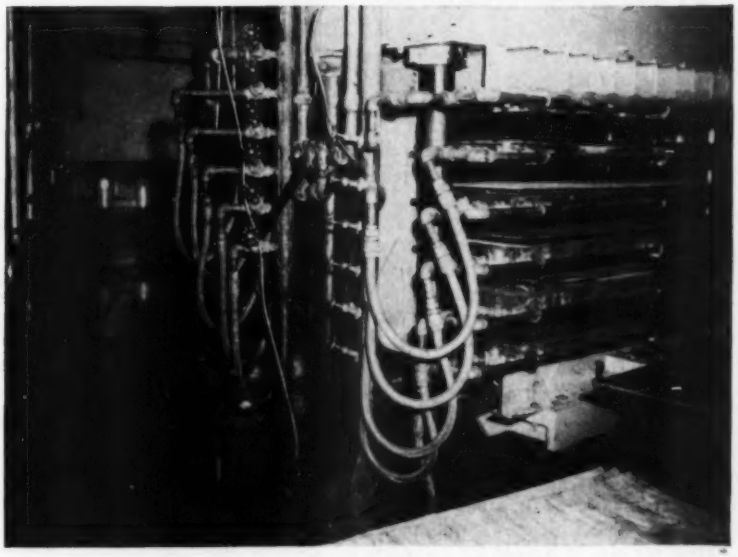
MISALIGNMENT

CMH Flexible Metal Hose is the simple, economical way to correct for misalignment, eliminating the need for complicated expensive hook-ups.

UNINTERRUPTED SERVICE

For installations requiring uninterrupted service, without repeated routine inspection, CMH Flexible Metal Hose is most dependable.

Where connections must withstand *heat and motion...



CMH REX-WELD Flexible Metal Hose

For services where the combination of *heat* and *motion* had made connections difficult to maintain, CMH REX-WELD Flexible Metal Hose is serving economically, dependably and safely. These all-metal assemblies, without packing, have long life free from leakage. There is no aging, deterioration or contamination.

CMH REX-WELD is furnished in steel or bronze in standard sizes from 3/16" through 4" I.D., with or without metal braid covering. Available with a choice of couplings to meet installation requirements.

Write for desired information . . . ask for detailed catalog data.

CMH—ONE dependable source for every flexible metal hose requirement

• CMH manufactures all standard types of flexible metal hose, both convoluted and corrugated, in a variety of metals; expansion joints for piping systems; stainless steel and brass bellows; various conduits and special assemblies of these components.

CHICAGO METAL HOSE CORPORATION

CMH

Leaders in the Science of Flexonics
MAYWOOD, ILLINOIS
Plants at Maywood, Elgin and Rock Falls, Illinois
In Canada: Canadian Metal Hose Co., Ltd., Brampton, Ontario
FLEXON identifies CMH products which have served industry for more than 47 years.

Names in the News...

TIPKA IS THE NEW ENGINEER AT NEWSPRINT SERVICE BUR.

The position of engineer in the Newsprint Service Bureau held by the late W. G. MacNaughton (cf P.I. and P.W., March, 1949) has been filled by the appointment of Vernon L. Tipka, formerly sales engineer with the Bird Machine Company and a veteran of World Wars I and II.

Mr. Tipka has had experience in both technical and managerial capacities, and during the recent war was assigned to package research and development, and later to the procurement of fine papers in the Office of the Quartermaster General. For a time after the war, he was paper consultant to the Civilian Production Administration. His schools include the University of Oregon and George Washington University.

A large part of Mr. Tipka's mill experience was with newsprint paper, which fits him to handle the numerous technical questions and studies covered by the Bureau.

Vernon L. Tipka

D. H. Kincaid

D. H. KINCAID BECOMES MANDO INSULITE DIVISION RESEARCH SUPERVISOR

The appointment of D. H. Kincaid to the research staff as superintendent of the Insulite base products research division has been announced by the Minnesota and Ontario Paper Company, Minneapolis.

Mr. Kincaid has had considerable experience in control and research work, both with paper and insulation board manufacturers. Following his graduation from Queen's University, Kingston, Ontario, in 1927 (where he received his B.S. degree in chemical engineering) he served for a year as laboratory demonstrator in industrial and physical chemistry at the University. He then joined the chemical staff of the Brown Corporation, Quebec, and later was employed by the Donnacona Paper Company where he had supervision of the development work and technical control of the company's production of insulating board and newsprint.

For over seven years Mr. Kincaid served on the Waste Committee of the Technical Section of the Canadian Pulp and Paper Association, working on the pulping and refining of fibrous materials from pulp mills and forest waste. Prior to joining Mando, he was chairman of the Quebec branch of the Technical Section.

▼

FRED DAMP LEAVES WARD PAPER CO.—GOES WITH FLAMBEAU AS P.M. SUPT.

On March 7, Fred C. Damp became paper mill superintendent of the Flambeau Paper Company, Park Falls, Wisconsin, following his resignation as general superintendent of the Ward Paper Company, Merrill, Wisconsin, a position which he had held for five years.

Mr. Damp is a member of The American Pulp and Paper Mill Superintendents Association, Inc.

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McDOWELL AND RICHARDS QUIT KEITH PAPER COMPANY

Two resignations have been announced by the Keith Paper Company, Turners Falls, Massachusetts. The duties of J. Norman McDowell, assistant manager, and Vincent Richard, superintendent, are being absorbed by other officials of the company for the present, and their positions will not be filled until it becomes necessary, President Paul Hodgdon said.

Mr. McDowell, formely president-treasurer of Carew Manufacturing Company, became assistant manager last September following the resignation of T. Richard Probst.

▼

▶▶▶ *Edward A. Johnston* has been appointed comptroller for Minnesota and Ontario Paper Company, Minneapolis, Minnesota. He has been assistant comptroller since 1945, and succeeds F. J. Hickling, resigned. Previous to his joining Mando in 1933, he had been affiliated with the Ford Motor Company in Minneapolis as chief accountant and as wholesale manager of Ford's Twin City branch.

▶▶▶ *Stanley M. Hunter* has been elected by the board of directors of the American Hoist and Derrick Company, St. Paul, Minnesota, to fill the newly created position of executive vice president. Expanding business was given as the reason for creating the new managerial post. Mr. Hunter became associated with American Hoist in 1936, and has served as vice president of sales and a member of the board of directors since 1945. He also holds board positions with other organizations.

Stanley M. Hunter

Palmer J. Lathrop

PALMER J. LATHROP ELECTED TO OFFICE OF EXEC. VICE PRES. CAMERON MACHINE

The election of Palmer Jadwin Lathrop as executive vice president has been announced by Cameron Machine Company, Brooklyn, New York.

Mr. Lathrop has been associated with Cameron since September, 1948. He was formerly vice president in charge of production for the Bristol-Myers Company.

▼

▶▶▶ *Ralph J. Kraut,* president and general manager of Giddings & Lewis Machine Tool Company, Fond du Lac, Wisconsin, has been appointed a director of Nekoosa-Edwards Paper Company, Port Edwards, Wisconsin.

▼

RESEARCH STAFF AT CALCO UNDERGOES SOME CHANGES

Announcement of several important research staff appointments in its Calco Chemical Division was recently made by the American Cyanamid Company, Bound Brook, New Jersey.

Dr. H. Z. Lecher, since 1938 associate director of research, has been named director of research of the Calco Chemical Division. He is a native of Vienna, Austria, and received his Ph.D. in 1913 from the University of Munich. Dr. Lecher came to this country in 1932 to direct the research on dyes at Calco. In 1938 he became associate director of research, and in this capacity directed Calco's research program in the fields of dyes and pigments.

Dr. Mario Scalera, formerly assistant

NEW ARMSTRONG Individual Dryer TEMPERATURE CONTROL

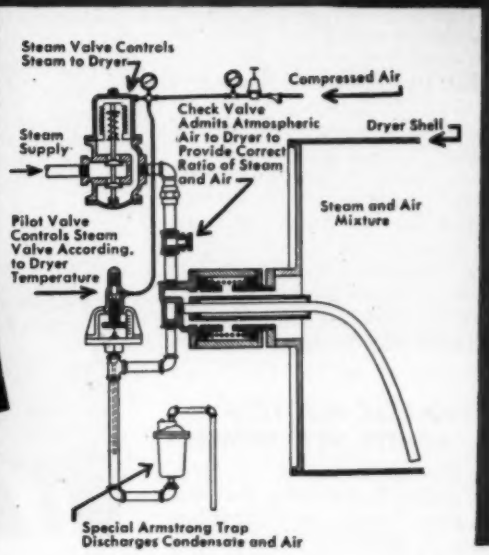
Keeps Wet End Dryers "Cool"

Prevents Sheet from Sticking and Curling

Controls Each Dryer Independently

Maintains Any Temperature from 100° to 250° F

Positive—Dependable—Guaranteed

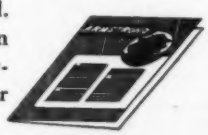

Steam Valve Controls Steam to Dryer
Compressed Air
Check Valve Admits Atmospheric Air to Dryer to Provide Correct Ratio of Steam and Air
Dryer Shell
Steam Supply
Steam and Air Mixture
Pilot Valve Controls Steam Valve According to Dryer Temperature
Special Armstrong Trap Discharges Condensate and Air

Armstrong Individual Dryer Temperature Controls on the wet end of a paper machine make it possible to increase the sheet temperature as slowly as required for good drying. The temperature of the first dryer can be set at say 140° F, and that of the succeeding dryers at 160°, 180°, 200°, and 220° or whatever setting may be required for drying a particular sheet.

Thus, we have a positive, dependable answer to an old drying problem: maintenance of relatively cool wet-end dryers to prevent the sheet from sticking to the dryer surface, and to avoid curl or cockle due to over-drying on one side.

These controls are also used after the size press. Not only are the non-picking, non-curling advantages secured, but here fairly constant control of moisture content is also secured.

For complete information on this proved method of improving paper drying, write for BULLETIN 187.



Reduced Temperatures Secured by Controlled Mixture of Steam and Air

When steam and air are mixed at atmospheric pressure, the temperature of the mixture will be that corresponding to the partial pressure due to the steam. For example, if the partial pressure of the mixture due to steam is 3.7 lbs. absolute, the temperature will be 150° F. The Armstrong Control diagrammed above automatically controls the ratio of steam and air to maintain accurately the temperature for which it is set. If the temperature of the dryer tends to rise, the pilot valve bleeds compressed air to release pressure on the steam valve bellows, causing it to throttle. A decrease in temperature causes a reverse action. Atmospheric air for the mixture enters through the check valve when the condensing rate of the dryer causes pressure to drop below atmospheric. When temperatures above 212° F are desired, the check valve stays closed, no air enters and steam pressure is raised to the required point.

ARMSTRONG MACHINE WORKS

816 Hoffman Street, Three Rivers, Michigan

INVERTED BUCKET STEAM TRAPS • PAPER MILL SPECIALTIES

director of the Organic Research Section, has been appointed assistant director of research in charge of the Organic Research Section. He is a native of Italy, and came to this country in 1927. He received his Ph.D. degree from Yale in 1935, and since joining Calco has been responsible mainly for research on vat dyes, soluble vats, pigments, and brighteners.

Dr. R. H. Kienle, known to the coating industries particularly for his fundamental work in polymers and in alkyd resins, has been named director of application research. A native of Massachusetts, he received his Ph.D. from Rutgers in 1938. Formerly with General Electric for 14 years, he has been associated with Calco for the last 15 years.

Dr. A. L. Peiker, formerly manager of the Dyes Technical Service, has been appointed associate director of application research. He is a graduate of Trinity College, and received his Doctorate from McGill University, Montreal. He joined the Calco Research Department in 1934.

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CONTROLLERS INSTITUTE ADMITS NEW MEMBERS

The Controllers Institute of America has elected the following three men in the paper industry to membership: William S. Beckham, secretary-treasurer of the Birmingham Paper Company, Birmingham; T. Cecil Davis, comptroller of St. Regis Paper Company (Canada) Limited, Montreal, Quebec; and William J. Hanley, comptroller of the Simplicity Pattern Company, Inc., New York.

The Institute, founded in 1931, is made up of the top financial executives of over 3200 leading American companies in every branch of industry.

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▶▶▶ *James E. Ziegler* has been appointed to the sales engineering force of The Cooper Alloy Foundry Co., Hillside, New Jersey, and will be stationed in Cleveland, Ohio, in order to provide increased technical service to the Pittsburgh-Cleveland-Detroit areas. Mr. Ziegler holds active memberships in the AIME, ASM, and ASE.

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▶▶▶ *Harry S. Gault,* identified with the paper industry for more than 50 years, has resigned from the sales department of the American Writing Paper Corporation, Holyoke, Massachusetts. He started as an office boy in the Linden mill in 1893, and was later manager of the Gill and Nonotuck divisions. In 1927 he transferred to the sales department in the general offices.

OFFICIAL CHANGES ARE MADE BY FOSTER WHEELER CORP.

Two changes in the executive personnel of the Foster Wheeler Corporation, New York, New York, were recently announced. Vice Admiral Earle W. Mills, USN (Ret.), has been elected executive vice president and a director of the company, and David McCulloch, formerly executive vice president, has been named vice chairman of the board.

Wartime Deputy Chief of the Bureau of Ships, Navy Department, and chief of that Bureau since 1946, Admiral Mills recently retired from the Navy. He was awarded the honorary degree of Doctor of Engineering by the University of Louisville in 1944.

Mr. McCulloch has served as executive vice president since 1935. He joined Power Specialty Company, which later became part of Foster Wheeler Corporation, in 1906.

E. W. Mills

Robert Faegre

FAEGRE ADVANCED BY MANDO TO SALES MGR. PAPER DIV.

Appointment of Robert Faegre as sales manager, Paper Division, Minnesota and Ontario Paper Company, Minneapolis, Minnesota, was announced recently. He has been assistant sales manager of the Mando Paper Sales Division since 1947.

Joining Mando in 1938, Mr. Faegre served in various sales capacities in the Insulite Division. First appointed as special representative in Denmark, he later was occupied with export sales activities in connection with the firm's insulation and hardboard products. He served as Supply Corps Officer, U.S. N.R. during World War II, and was charged with the responsibility for specifications, stock control, and procurement of all paper and paper products for the Navy.

In his new position, he succeeds R. O. Warner, resigned.

▼

▶▶▶ *George G. Raymond, Jr.,* sales manager at Lyon-Raymond Corporation, Greene, New York, was recently elected vice president of the company. He will continue to act as sales manager in addition to his duties as vice president.

▶▶▶ *R. B. Putman* has been appointed to fill the newly-created position of general sales manager at American Lumber & Treating Company, Chicago. Mr. Putman began working in American Lumber in 1934 as an operating department trainee, was appointed advertising manager in 1938, and sales promotion manager in 1945. He will continue to direct those activities in addition to his new assignment. This company produces pressure-impregnated forest products for distribution through the lumber industry.

▼

▶▶▶ *Paul J. Welsh* has joined the research staff of E. F. Houghton & Company, Philadelphia. He was formerly on the development staff of B. F. Goodrich Company, Akron, Ohio, and before his Navy service he was with the Bureau of Mines. He is a member of the American Chemical Society, and received his master's degree from Carnegie Institute of Technology.

▼

HAMMERMILL RETAINS RAY BOWER FOR PERMANENT WORK IN ITS WOODLANDS DEPT.

After five months in a consultant capacity, Ray F. Bower has become a permanent member of the Woodlands Department of the Hammermill Paper Company, Erie, Pennsylvania.

Mr. Bower's work at Hammermill will be in connection with local pulpwood supplies. For the past eleven years he has been employed in industrial work closely associated with the pulp and paper industry, following training in forestry at Michigan State College and the New York State College of Forestry.

▼

▶▶▶ *John G. Kirkpatrick* has been appointed exclusive representative of The Brooks Rotameter Company, Lansdale, Pennsylvania, in the Pittsburgh area which includes western Pennsylvania and West Virginia. For the past seven years he has been instrument engineer for the Koppers Company.

▼

TWO TECHNICAL APPOINTEES NAMED BY SORG PAPER CO.

Announcement was recently made by The Sorg Paper Company, Middletown, Ohio, of the appointment of D. M. Yost as technical director and D. G. Goodman as assistant technical director.

Mr. Yost is past president of the Ohio Section of TAPPI, and a member of the Society of Plastic Engineering and of the American Chemical Society. He has been with Sorg since 1938.

Midwest Pulper

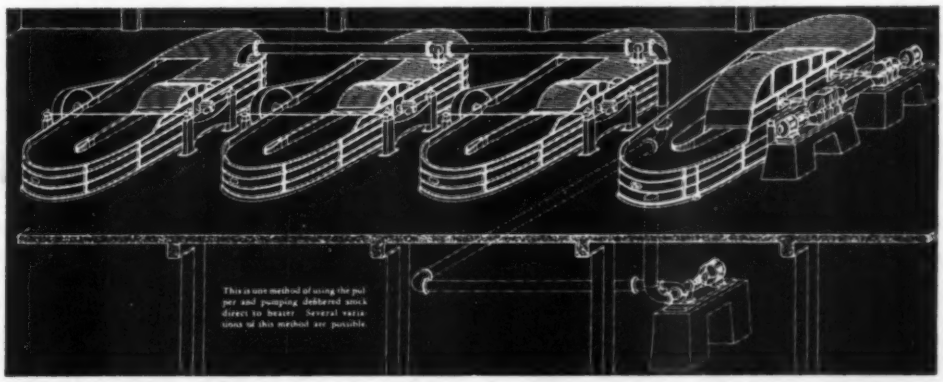
The Midwest pulper is extra-rugged—capable of work that would break down the best beater ever built. It is being used ahead of and discharging direct to beaters or chest, in some cases replacing beaters entirely.

One mill with four Midwest pulpers is reducing to thoroughly defiberized form over 200 tons of virgin pulp every 24 hours. No shiners or fish eyes—a thorough slushing job. Other mills operating one or two units for years are obtaining like results.

When revamping your preparatory system, consider the Midwest heavy-duty pulper:

a. To slush dry pulp thoroughly, fast, and economically.
b. To defiber unbleached sulphite or kraft preparatory to bleaching.
c. To re-slush broke.
d. For color or chemical blending.
e. To hold down power costs.
f. To reclaim floor space.

To use "refining" beaters as pulpers is a reckless and costly operation—high repair factor. To use this rough-and-ready pulper for such work is economical operation—virtually no maintenance at all.



This is one method of using the pulper and pumping defibered stock direct to beater. Several variations of this method are possible.

HAVE US TELL YOU MORE—Cite case histories and submit technical data on the entire range of sizes and capacities.

The Midwest-Fulton Machine Co. DAYTON 2, OHIO

Mr. Goodman is also a member of TAPPI. He has been with Sorg since graduating from Purdue in 1938, except for four years in the Armed Forces.

▼

▶▶▶ *Robert L. Fitts,* president of Southern Advance Bag & Paper Company, and retiring president of the Paper Bag Institute, was the guest of honor at the Institute's annual meeting, when he was presented with a handsome watch as a memento of his three terms of office. H. Stuart Daniels of Union Bag & Paper Company was elected to succeed him.

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▶▶▶ *Dr. Eugene L. Woroch* has joined the staff of the Bjorksten Research Laboratories, Madison, Wisconsin, as a section leader. He was previously connected with the Wisconsin Alumni Research Foundation. Receiving his doctor's degree in organic chemistry in 1947 from the University of Wisconsin, he has been working in the field of sterol type substances.

James E. Henning also has joined the Bjorksten staff as a research chemist. He was previously connected with the Kester Solder Company, Chicago. He received his B.S. degree at the University of West Virginia.

▶▶▶ *William G. Powers,* for two years superintendent of the Crocker division, American Writing Paper Corporation, Holyoke, Massachusetts, has resigned from that position. He had been employed in the division for 27 years. His father, William G. Powers, Sr., was assistant superintendent of the Crocker mill, where he worked for 47 years.

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▶▶▶ *Harry M. Brostoff* has resigned the position he has held for the past six years as operating vice president of the James Flett Organization, Inc., Chicago. He resumed private law practice on April 1, however, he will continue as general counsel for this nationwide scrap sales agency—a post which he has held for the past 20 years. Attorney Brostoff will specialize in matters peculiar to the waste material trade.

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▶▶▶ *W. S. Huss* was recently appointed sales manager of the Southern Division, Acme Steel Company, Chicago. His headquarters will be in Atlanta, Georgia. Mr. Huss has been engaged in the selling and marketing of Acme products for the past thirty years, and replaces F. H. Webb who retired from the company on his 30th anniversary. Assisting Mr. Huss will be J. C. Brill, New Orleans district manager, and C. A. Carrell and W. G. Polley, special representatives.

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▶▶▶ *Creighton Hill* of Boston was elected to the board of directors of Bird & Son, Inc., East Walpole, Massachusetts, at the annual meeting of stockholders held recently. Mr. Hill is personnel director of the company, and also is in charge of industrial relations (Cf. P. I. and P. W., p. 1642, Feb., 1949).

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▶▶▶ *T. W. Tinkham,* former president of Technical Managers, Inc., has been appointed director of manufacturing for the San-Nap-Pak Manufacturing Company, Inc., New York City. Mr. Tinkham will direct the operation of San-Nap-Pak's three mills, located at Wheelwright, Massachusetts, Northampton, Massachusetts, and Wilmington, Delaware, which make this company's line of nationally advertised paper products.

▼

▶▶▶ *Harold H. Fish* was recently appointed by Draper Brothers Company, Canton, Massachusetts, as sales representative in lower New York State, New Jersey, Pennsylvania, Maryland, Delaware, and West Virginia, with headquarters at 210 Sedgwick Street, Syracuse, New York. Mr. Fish has been associated with the paper industry since 1922, and for the past five years has been covering the entire East Coast as a sales representative.

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▶▶▶ *R. A. Nash,* of Cincinnati, Ohio, has been elected vice president and director of The Sorg Paper Company, Middletown, Ohio. He succeeds H. C. Johnson who has retired but will remain on the board.

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▶▶▶ *Leonard T. Beale,* president of the Pennsylvania Salt Manufacturing Company, has been re-elected a member of the National Industrial Conference Board for the forthcoming year. The Board, founded in 1916 as an independent and nonprofit institution for research and education in economics and business is supported by nearly 3,000 business concerns, trade associations, labor unions, government bureaus, libraries, colleges and universities.

▼

▶▶▶ *Alfred I. Stuart* as head of the Methods Engineering Department of the Hyster Company, manufacturer of industrial trucks and tractor equipment, will assume full charge of methods engineering for the three plants in

THE

Cady

ELECTRIC

Bursting Tester

MAKES THE "CADY" OR MULLEN OR POP TEST . . .

Uniform 12 second cycle registers bursting pressure of papers and boards. Area under test always visible; non-slip clamp prevents creeping. Can be supplied with various gauges. Write for complete data and prices.

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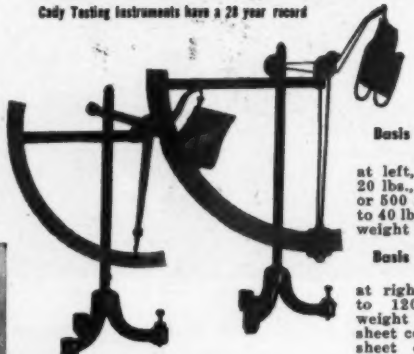

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Basis Weight Tissue Scale

at left, registers 0 to 20 lbs., weight for 480 or 500 sheet count; 20 to 40 lbs. with doubling weight (furnished).

Basis Weight Paper Scale

at right, registers ¼ to 120 lbs., shows weight for 480 or 500 sheet count; also 1000 sheet count. Various graduations available.

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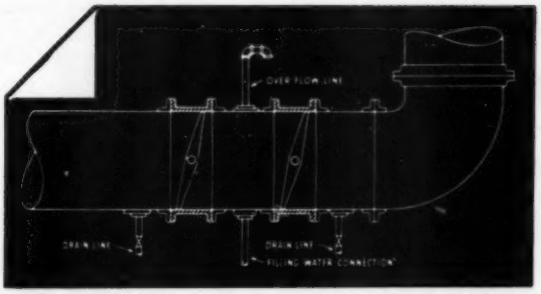
R-S valvEvents

• EXCERPTS FROM THE R-S BOOK OF EXPERIENCE •

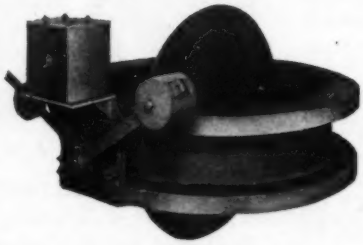
How to Seal a Gas Line



The sealing of gas lines is required in many plants as a protective measure. It is advantageous to adapt the method sketched above because of its low cost, positive seal and the fact that it requires minimum space in the line.

When the gas is to be shut off, the two R-S Valves are closed and the space between filled with water or other material, thus forming a tight seal.

Immediate Shut-Off or Vent

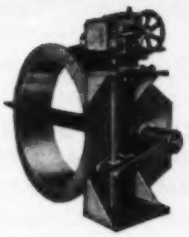


No. 628. Should solenoid operator function, the R-S Valve installed in a line either closes or opens immediately.

The R-S Solenoid Trip Valve is used for emergency service. The solenoid can be arranged with the counterweight mechanism to open or close the valve and hold it there in one position or the other. If for any reason the solenoid functions, the latch is tripped, which permits the counterweight to open or close the valve by gravity. The assembly is suited to shut off the flow or to open a vent and requires manual reset. Can be constructed of any metal or alloy and in various sizes for air, gases, steam, oil, water and other services. Types 649 and 696 are spring loaded (spring utilized instead of counterweight). Very popular for marine service.

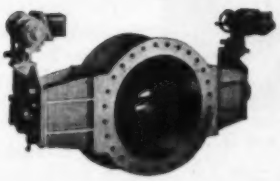
Write for catalog No. 17 or consult with the R-S representative in your locality. You will find the address and phone number listed under "R-S Products Corporation, Valves."

R-S Products Corporation, Wayne Junction, Philadelphia 44, Pa.



No. 728. 54-inch 50-pound Iron Valve for water service. Extremely rugged construction. Limitorque electric motor drive with threaded reach rod moves valve very slowly to prevent water hammer.

No. 722. 16-inch 125-pound Cast Iron Valve equipped with rubber spool for positive shut-off. Air Cylinder operated. Position of valve vane indicated by operating lights.



No. 725. 36-inch by 8-inch 150-pound Class B Alloy Steel Dual Valve. Controls high pressure drop and small volume or low pressure drop and large volume.

No. 719. 12-inch Steel Angle Slide Valve with 300-pound American Standard raised face flanges. Air cylinder and rising stem hand wheel operator with declutching unit. Controls liquids, gases and solids including catalysts.

Portland, Oregon; Danville and Peoria, Illinois. He joins the Hyster Company after several years of experience with the Western Electric Company, The E. I. du Pont de Nemours & Company, Inc., and a consulting industrial engineering organization.

▼

HAROLD STOSE JOINS SAM TOUR & CO. AS HEAD OF CHEM. ENGINEERING DEPT.

As head of the Chemical Engineering Department, Harold F. Stose has joined the engineering consulting firm of Sam Tour & Co., Inc., New York.

With more than twenty years experience in chemical research, development, and testing, Mr. Stose has been in charge of chemical research groups for such organizations as Owens-Illinois Glass Company, Hood Rubber Company, RCA-Victor Company, Radio Inventions, Inc., and American Chicle Company. A few of the products he has developed are "wooden" heels made from waste sawdust, electro-sensitive recording paper, the first commercial vinylite phonograph records, the first blow-molded plastic bottles made from injection molded blanks, etc.

Mr. Stose assisted the late Carleton Ellis in the writing of his book "The Chemistry of Synthetic Resins," and has organized and directed a research library of 2000 volumes as well.

A graduate of the Massachusetts Institute of Technology, Mr. Stose is a member of TAPPI, a Fellow of the A.A.A.S., past national councillor of the American Chemical Society, a member of Society of Plastics Engineers, and a member of the Special Libraries Association.

Necrology

WILLARD H. DOW

The crash of his private plane near London, Ontario, March 31, took the life of Dr. Willard H. Dow, president of The Dow Chemical Company. Mrs. Dow and three other persons were killed in the accident.

Willard H. Dow

For two generations, the name of Dow has been recognized by the chemical and industrial fields as having a touch of genius that has brought much to the world. The late Dr. Dow's father, Dr. Herbert A. Dow, founded the Dow Chemical Company, Midland, Michigan, which company has become one of the world's leading producers of chemicals.

Willard H. Dow was born in Midland, January 4, 1897. He was graduated from the University of Michigan in 1919 with a B.S. degree in Chemical Engineering. That same year he began his career with the Dow Chemical Company. In 1922 he was made a director; he became assistant manager in 1926. Upon his father's death in 1930, he took over the duties of president and general manager of the company at the age of 33. Several affiliate companies were headed by Dr. Dow and he was active in a long list of national technical and industrial associations. Notably among these were: American Chemical Society, American Institute of Chemical Engineers, and Advisory Board of Chicago Chemical Procurement District of the Chemical Warfare Service of the U.S.A.

Degrees conferred upon Dr. Dow were: Honorary Doctor of Science, 1939, Michigan College of Mining and Technology; Honorary Doctor of Engineering, 1941, University of Michigan; Chandler Medalist, 1943 (Columbia University); Honorary Doctor of Engineering, 1944, Illinois Institute of Technology.

Mrs. Dow was born and raised in Kalamazoo, Michigan, where, as Martha Pratt, she graduated in 1919 from Kalamazoo College with a B.A. degree, Magna cum Laude. Recently she made a gift of science books to Mandelle Library of Kalamazoo College.

The Dows are survived by one son, Herbert H. Dow II, who is a student at Massachusetts Institute of Technology.

▼

▶▶▶ *Frederick McNicoll,* for many years manager of the New York office of the Racquette River Paper Company, passed away in Madrid, New York, at the age of 77. He had been with the company since 1915, and managed the New York office for thirty years.

▼

▶▶▶ *Atwell B. Williams,* sales manager, Mechanical Roll Division, American Wringer Company, Inc., Woonsocket, Rhode Island, passed away at his home in Smithfield, Rhode Island, February 27. He is survived by his widow.

▼

H. L. KUTTER

The former president of The Black-Clawson Company, H. L. Kutter, passed away on March 2 in Hamilton, Ohio, at the age of 77. He had been associated with the company in various capacities for over half a century. After relinquishing the presidency in 1946, he continued serving as a director until his passing.

When Mr. Kutter came to the United States in 1891 at the age of 19, he was already a papermaker, having started to work in early boyhood in a European mill producing currency paper and other all-rag papers. Before joining Black-Clawson in 1896, he had held engineering positions with several American paper companies. He became secretary of the company in 1911, general manager in 1923, and president in 1930.

Mr. Kutter's primary interest in papermaking was engineering, and he contributed many improvements to paper machines.

H. L. Kutter

J. W. Valiant

J. W. VALIANT

For many years a vice president and director of the Harris-Seybold Company, Cleveland, J. W. Valiant passed away March 12 in Miami, Florida. He was 60 years of age, and was well known in graphic arts circles, especially in the East where he had spent most of his 40 years in the industry.

Since May, 1922, Mr. Valiant had served the company as eastern representative. In 1932, he became vice president and eastern district manager and was elected to the board of directors in 1935. In December of last year, he was appointed to the executive staff of the company as special assistant to the president and general manager, G. S. Dively.

Because of his years of experience and his knowledge of the graphic arts, Mr. Valiant was recognized as an authority on pressroom and bindery operations. He was a member of several graphic arts associations including the National Graphic Arts Exposition, Inc., of which he was a director.

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More than 20,000 companies now maintain the Payroll Savings Plan, by which their employees invest in U. S. Savings Bonds automatically every pay day. This Plan builds security not only for the individual employees, but for their companies and for the nation!

As you know, Savings Bonds pay $4 at maturity for every $3 invested. Thus they help create a "rainy-day" fund for each Payroll Saver, increasing *his* security.

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Proof that employees want P. S. P.

Practically everybody wants to *save*. Every one of your employees could be saving *more* if he were obtaining Savings Bonds regularly, right where he works. Even with today's high prices, it has been proved that between 40% and 60% of America's working millions—at any wage level—can and will buy Bonds through Payroll Savings *if management sponsors the Plan and if a fellow worker asks them to sign up.*

Yes—your employees want to help you build security—for all of us. It's up to you whether they get the chance. All the help you need is available from your State Director, U. S. Treasury Department, Savings Bonds Division. While it's on your mind, why not call him? Or write the Treasury Department, Washington 25, D. C.

The Treasury Department acknowledges with appreciation the publication of this message by

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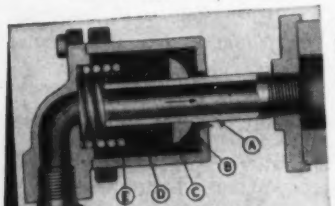
In one sense, in its ability to pay its own way, the Johnson Joint has always been self-supporting. Its packless, self-lubricating, self-adjusting design slashes maintenance costs, boosts operating efficiency. Now, to crown all these virtues comes the new Type S, which needs no external supports. It's the final answer for those tough jobs such as calender service . . . shifts as the roll shifts to end completely the life-shortening wear that rides along with misalignment.



Nipple (A) is fastened to roll or drum. Carbon-graphite ring (B) effects seal against rotating collar (C). Guide (D) supports joint, is also of self-lubricating carbon-graphite. Spring (E) is for initial seating only; in operation joint is pressure-sealed.

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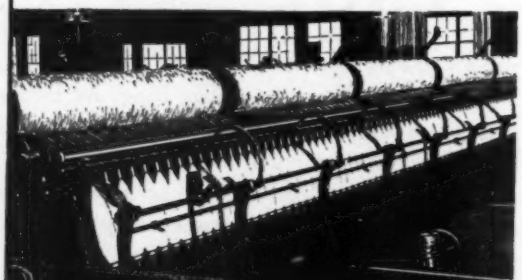

SPINNING THE YARN FOR TENAX FELTS

Modern, efficient machinery—and the craftsmanship and skill of long experience combine at the Lockport Mills to bring you the finest felts for making the finest paper.

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Practical SHORTS

Readers are invited to submit short, practical articles for this department. The items should be original and should relate to ways and means of handling production and maintenance jobs. Where possible, articles should be illustrated. Rough sketches only are required. Payment will be made for acceptable items upon publication.

When Figuring Worm Gears, Here is a Better Rule

Here is a new rule—and a good one—for determining the efficiency of worm gears. It is more accurate than other rules that the writer has seen in print. It relates to single worm reductions, and is as follows: Multiply the reduction ratio by 0.0047 and subtract the product from one. Thus for example if the reduction ratio is 50 to 1 we have this: 50 x 0.0047 = 0.235. Then 1 — 0.235 = 0.765 =76.5 per cent efficiency.

It should be noted that this rule relates only to "single reductions" and it might be well to add that it should not be applied if the reduction ratio is greater than 100 to 1. Why? Because it is obvious that at some point the rule would show an efficiency of zero, and that would be wrong. Thus for instance if you will try to work out a reduction of 213 to 1 you will find that the rule gives an efficiency of exactly zero because 0.0047 x 213 = 1. Subtracting 1 from 1 you get zero, of course. So, don't apply the above rule to single reductions greater than 100 to 1.

As a matter of fact single reductions as great even as 100 to 1 are seldom made because of their inefficiency. Higher efficiencies are attained by using two reductions. Two reductions, usually, are enough. To explain the point let us take an example in which the total reduction is to be 50 to 1, the first reduction to be 5 to 1 and the second reduction 10 to 1. That will give us a total reduction of 50 to 1 because 5 x 10 = 50. Applying the above rule for each reduction we have:

First reduction: 1 — .0047 x 5 = 0.977 Efficiency

Second reduction: 1 — .0047 x 10 = 0.954 Efficiency

Now to find the overall efficiency we must multiply these two efficiencies together and we get 0.977 x 0.953 = 0.93. This means that the efficiency will be 93 per cent as compared with the 76.5 per cent efficiency computed above using only a single reduction.

Again, let us say that you want a reduction of 2500 to 1. The result can be obtained in several ways, but let us first try a double reduction of 50 to 1 and 50 to 1. That will give us a 2500 to one reduction because 50 X 50 = 2500. In the first problem above we found the efficiency of a 50 to 1 reduction, single wheel, to be 76.5 per cent. Double reduction we would then have 0.765 x 0.765 = 58.5 per cent efficiency. In other words, nearly one-half of the energy would be lost in friction.

From an efficiency standpoint it is obvious now that it would be better to make it a quadruple reduction. Thus above it was shown that by using a 5 to 1 and 10 to 1 double reduction the efficiency would be 93 per cent. So, using two such reductions in series the overall efficiency of the quadruple reduction would be 0.93 x 0.93 = 0.86 or 86 per cent efficiency as compared with 58.5 per cent. The power saving would be considerable—over 27 per cent.

—W. F. SCHAPHORST, M. E.

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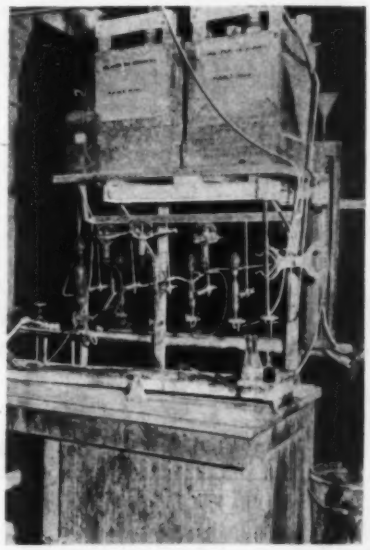
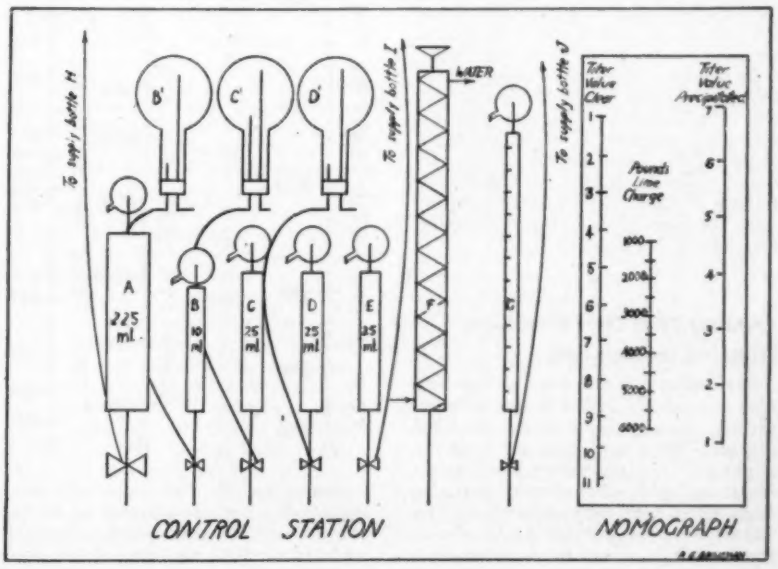
An Improved Control Table

This article presents a description of the design and operation of an improved control table, to aid nontechnical operators in determining the lime charge for kraft green liquor causticization. The analysis is essentially a modification of the TAPPI standard for determining carbonate in green liquor. The main reason for setting up such a station was to enable nontechnical personnel to perform an accurate volumetric quantitative analysis in a short period of time.

Automatic pipettes, arranged as shown in the diagram below, were used to promote speed, accuracy and safety in handling the alkaline green liquor samples. The testing is done as follows: A sample of the hot green liquor (approximately 200 cc) is collected before cauticization, and is cooled by passing it through the glass coil water-cooled condenser. The length of the condenser and the temperature of the cooled water are regulated so that the cooled green liquor is at a temperature comparable to the calibration of the volumetric glassware (20° C). This cooled sample is then placed in flask B^1 above the 10-ml. automatic pipette B, and two 10-ml. samples are withdrawn from it and placed in the flasks C^1 and D^1. To flask C^1 25 ml. of 20% barium chloride are added from supply bottle I by the use of automatic pipette E. Distilled water is also added to flask C^1 from the supply bottle H by the use of the 225-ml. automatic pipette A. Flask C^1 is then inverted as shown, and the barium carbonate precipitate allowed to settle. 225 ml. of water are also added to flask D^1 by the same method, and this flask is inverted as shown. From flask



D^1 a 25-ml. sample is withdrawn into a flask for titration by the use of automatic pipette D. After this titration has been completed, sufficient time will have elapsed to allow the precipitate in flask C^1 to settle. A sample from it is then withdrawn by the use of the 25-ml. automatic pipette C. The normal acid used for the titration is supplied



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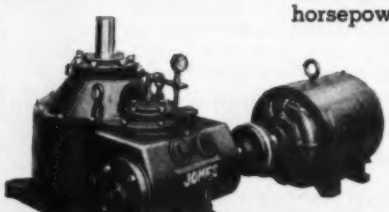
HERE is a line of machines that fills a long felt need for double reduction units of the fully enclosed type to be used for agitators, mixers, etc. requiring a vertical shaft drive.

Many of these Jones units have established excellent performance records in a wide variety of service. As a result of that experience a complete standard line has been developed covering 15 standard ratios ranging from 40 to 1 to 250 to 1 for all common motor speeds and a wide range of horsepower ratings.

• This Jones Worm-Helical Speed Reducer on a lacquer agitator is typical of the wide range of services for which these drives can be used such as ore roasters, pulp tank mixers, furnaces, bending rolls and similar applications.



The new Jones Bulletin No. 75 covers complete details on these new Worm-Helical Speed Reducers, with rating tables, dimension diagrams, torque charts and other application information. We shall be pleased to send you a copy.

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from bottle J and titrated from the automatic burette G. The two titer values are then used to determine the correct lime charge for each batch of green liquor by the use of a nomographic chart plotted from the following equation:

$$\left(\frac{235}{250}\right) X \frac{-260}{250} Y \Big) K = Z,$$

where X is the titer value of the sample containing carbonate, Y is the titer value of the sample decanted from the barium carbonate precipitate, K is a constant containing the conversion factors necessary to convert from the ml. of normal acid to pounds of lime, and Z is the weight of the lime charge.

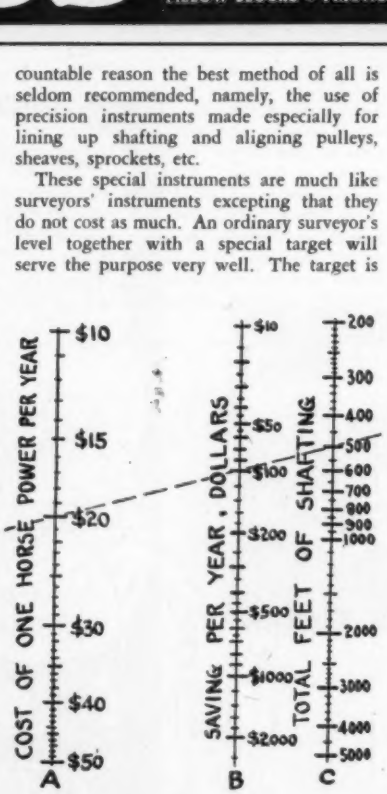
By the use of this control set-up and the nomographic chart shown, the operator has only to be instructed in procuring the proper colormetric end point, as the sample preparation and final lime charge calculations are done by mere mechanical manipulations.—ROBERT E. BRINGMAN, Technical Department, Nekoosa-Edwards Paper Company, Port Edwards, Wisconsin.

▼

Owning Your Own Precision Aligning Instruments

The author finds that concerns frequently have machinery in need of alignment—belts, shafting, gears, sprockets, sheaves, etc.—and they ask, "What is the best way to do this aligning?" Invariably some method involving string, cord, wire, threads, measuring sticks, levels, hose, and plumb bobs is given. These various methods are usually all very good and quite correct, but for some unaccountable reason the best method of all is seldom recommended, namely, the use of precision instruments made especially for lining up shafting and aligning pulleys, sheaves, sprockets, etc.

These special instruments are much like surveyors' instruments excepting that they do not cost as much. An ordinary surveyor's level together with a special target will serve the purpose very well. The target is



suspended from the shaft and is self-centering in such a way that the center of the target is always the same distance from the center of the shaft regardless of the diameter of the shaft. It is an ingenious device.

One setup of the level along a given lineshaft, regardless, almost, of its length, is sufficient to align the shaft both vertically and horizontally with micrometer accuracy. The work is much more quickly and more accurately done than by any other method thus far devised, and it is not likely that a better method will ever be developed. Some modern plants are equipped with an alignment device of this kind which, they find, almost invaribly pays for itself in a short time. General tests indicate that a special aligning device of this type usually assures a saving of 1 hp for each 100 ft of shafting. Thus, for instance, if you have 500 ft of shafting you can safely figure that the device is the means of saving 5 hp per year. At the rate of $30 per horsepower per year it is easy to figure that the device earns $150 per year which surely is good interest on the investment.

To assist the reader as much as possible the writer has prepared the accompanying chart. Simply run a straight line through the cost of a horsepower per year in column A and through the total length of shafting in feet, column C. The estimated saving per year is immediately found in column B.

For example, the dotted line drawn across the chart shows that if one hp per year costs $20 (column A), and if you have 500 ft of shafting in your plant (column C), proper alignment will save at least $100 worth of power per year. There is no question but that correct shaft alignment *is very important.*

—W. F. SCHAPHORST, M. E.

International Review.....

News from Other Countries . . Technical Developments Adapted from Foreign Literature

Development Projects in India

The government of India has sanctioned the establishment of three paper mills in Cooch-Behar, Coorg and Orissa. It is hoped that by 1956 India may produce enough paper for its own use. The following new units are completed, under construction, or to be built:

National Newsprint and Paper Mills—This will be the first newsprint mill in India, and it is expected to produce 30,000 tons of newsprint per year. It will be situated near Chandni in C.P.

Licenses for the import of machinery from the U.S.A. to the value of approximately Rs. 88 lakhs, have been issued. The mill is expected to go into production by 1950 (Cf. P.I. and P.W., p. 1082, Nov., 1947).

Ballarpur Paper & Strawboard Mills—This mill will be located in the Chanda District, C.P., and will produce approximately 6,000 tons of paper per year. Licenses have been issued for the import of machinery and the unit is expected to go into production by 1950.

Tribeni Tissues Limited—This project will be exclusively for the manufacture of cigarette paper under the Managing Agents of Messrs. Balmer Lawrie & Co., Ltd., Calcutta. The plant will have a capacity of about 3,000 tons per year. Machinery worth approximately six lakhs already has arrived in India. The power plant has been completed and the mill is under construction.

Orient Paper Mills—An additional paper plant has been installed by the mills for the manufacture of cover and account book papers. The initial production is approximately 110 tons per month.

Standard Board and Paper Mills—The installation of a 10-ton paper plant will raise the capacity of this Calcutta mill by another 3,000 tons per year.

[Editor's Note: These items on India have been taken from the January, 1949 issue of *Indian Pulp and Paper*, published in Calcutta. The following references are given without respect to current exchange values: Anna = 1/16 Rupee, or .0228 cents; Rupee = 16 annas, or .365 cents; Lakhs = 100,000 Rupees.]

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Australian News

▶▶▶ THE FIRST PART of the year saw the arrival in Australia of newsprint shipments from Bowaters and the Reed Mill under the English Board of Trade scheme.

The occasion of the arrival of the first installment of 4,000 tons of reel newsprint, manufactured by the English mills of Albert Reed & Company, was the reason for the visit of D. F. Bune, personal assistant to Col. C. D. Sheldon, managing director of the mills.

The Reed newsprint represents a total of one-third of 12,000 tons of British newsprint for Australia from Scandinavian pulp furnished by the British Board of Trade. The other two-thirds was manufactured by Bowaters.

After commencing production in November, Reed Mills delivered the first shipment in the middle of January and the first of ten shipments is expected to arrive in Australia by the middle of April.

Bowater Mills are reported to have completed their work, and 6,000 tons of their 8,000 ton quota are estimated to have reached Australia in December and January.

Australian Newsprint Mills Pty., Ltd.

This company hopes to keep its expansion program up to schedule and it is expected that the new plant will be in operation in 1950. At present, the mills are producing only about 30,000 tons of newsprint a year, but by the end of 1950 it is hoped to increase output to 80,000 tons. Cost of the expansion is estimated at £3,000,000 (about $10,000,000).

About 500 tons of paper machine components, mostly dryer cylinders (each weighing approximately eight tons), baseplate and steamheaders already have arrived at Boyer, Tasmania, where the mills are situated. This machinery has been manufactured in Canada by Dominion Wheel & Foundry Ltd. The first two 2500 hp motors also arrived and it is hoped that five more will follow in the next few months.

N. Z. Forest Products Ltd.

In connection with the arrangement under which this company will send 12,500 tons of pulp yearly to Australian Newsprint Mills Ltd., the chairman of the New Zealand Company said recently:

"Arrangements have been made to increase the size of the pulp mill from 10,000 tons to 25,000 tons a year. The advantages of the arrangement with the Australian mills are very considerable, including the greatest utilization of forests, lower production costs through the higher output of pulp, the considerable savings of dollars due to the displacement of the use of American pulp and the contribution to a bigger trade from New Zealand to Australia which is most desirable in every way. . . .

"Present total consumption in the two countries is approximately 300,000 tons of newsprint and 40,000 tons of kraft pulp, in addition to pulp and paper for other purposes that is being imported. We have no doubt that every ton of newsprint, every ream of paper, and every bale of pulp now imported from other overseas sources could be produced in New Zealand if an enterprising determined effort is made by New Zealand and Australian governments, pulp and paper manufacturers, and forest owners."

Personalia

In connection with the New Zealand agreement, H. D. Giddy, deputy chairman, and S. L. Kessel, managing director of the Australian Newsprint Mills, are visiting New Zealand.

S. E. Walmsley, chief engineer of the Bowater Paper Corporation, is at present in Australia to inspect mills in Tasmania, Victoria, and New South Wales. Mr. Walmsley arrived in Australia after a tour of South America, South Africa, and New Zealand.

▼

British Paper Notes

(February, 1949)

▶▶▶ AFTER NEARLY a decade of being subjected to all manner of restrictions, through government control, the British Paper Trade is finding it a little difficult to adjust itself to the new large measure of decontrol.

All manner of conflicting stories are abroad: on the one hand, it is considered that printers throughout the country possess large accumulated stocks of paper which they will consume first, now that the market is much freer, before any serious reordering; and on the other, that the production of paper, during the present license period, will be very little more than in the past period. Therefore, the overall shortage will continue. Coupled with these suggestions it is believed in some quarters that prices will decline again, and this anticipation should cause a further withholding of purchases.

In effect, nothing of the kind appears to be happening, for orders are being received at a fairly healthy rate, although there is not the usual beginning of license period scramble, and stocks held by merchants are being called upon regularly. Actually the potential of consumption is still much greater than production, and if all requirements were allowed to be met, they would need a much greater production than in prewar. It is possible that the uncertainty of the coming budget, which might relieve the heavy burden of the purchase tax, is having a far greater effect on current printing demand than anything else. Also the desire on the part of many to see the present "government of restriction" replaced by a "government of enterprise" is having its effect upon industry. There is, however, every probability that buying will be more equally spread over the four months license period, and that papermakers will have little, if any, production to spare when July is reached.

While there is still a fair amount of mill finished and supercalendered wood printing and coated papers available, there is a definite shortage of M.G. poster papers; no doubt, due in part to the fact that poster printing also has been relieved of control, and that the government consumes much

greater quantities of this class of paper than in prewar days.

The makers have been granted a little extra materials for slightly higher production of certain grades of paper, and it is anticipated that total production of paper and boards will reach 80 per cent of prewar during the next four months. If so, this will be at the annual rate of 2,080,000 tons, and as newsprint production is still pegged at 50 per cent (400,000 tons only) production of other qualities must be proportionally higher than 80 per cent.

Contrary to the expectation of falling prices, a new price order which was due to come into force early in March increased the cost of the wood free grades of printing papers by 25/– per ton and wood quality cartridges by 27/6 per ton. This increase is due to the furnish of these papers being improved, by a reduction in the proportion of mechanical wood and waste papers included in their furnish. Although these papers are still termed wood free papers, they have not contained 100 per cent pure wood furnish since early war days. The full pure wood furnish is not allowed for home consumption, but the standard furnish is permitted for the production of papers for export, and for these export orders extra supplies of materials are granted.

Although the improved material supply position was maintained during 1948, the present year has opened with a slight decline on the previous month, for imports of materials during January were down by 4,000 tons under December to a total of 143,161 tons. The loss was on wood pulps, and even greater than the 4,000 tons, as imports of esparto grass reached the record figure of 34,106 tons, over 12,000 tons higher than the previous month.

Despite the efforts being made to continue the use of straw on a large scale as in the war days, it would appear that the return of esparto grass (the importation of which is at a much higher rate than in 1938) will possibly defeat this effort, particularly as the prices of material are declining, and esparto prices may eventually be affected. The fiber yield of straw is not so high as that from the grass, and this, and the extra cost of production, naturally narrows the differential in price. Also operating against the straw is the finer quality of paper produced from the grass. These papers are softer than both straw and wood papers, and as the shortness of the grass fiber is not seriously affected in the beating process, the resultant papers are closely packed, level in surface, and do not stretch in printing. The fiber being whole is, therefore, resistant to pressure. Consequently, grass papers are used extensively for offset printing work and as a base for the better quality coated papers.

▼

New Trade Agreements

Under a trade agreement between Finland and the USSR for 1949, signed in Moscow December 17, 1948, it is expected that trade will reach $100,000,000. Finnish exports will include pulp, newsprint, cardboard and paper products, pulpwood, and other forest products.

Finland and Poland have entered into a supplementary trade agreement which provides for Finnish exports of lumber and pulp to a value of $5,000,000 against equivalent Polish exports of chemicals, iron and steel products.

An annual trade agreement between Finland and Belgium-Luxembourg was renewed for a total trade of about $45,000,000 (2,000,000,000 Belgian francs). Finland will export lumber, pit props, poles, pre-fab houses, newsprint, fiberboard, pulp, plywood, paper and cardboard products. (From *Foreign Commerce Weekly*)

▶▶▶ CERTAIN ITALIAN paper manufacturers (according to unconfirmed press reports) have requested the government to increase customs duties on imported newsprint by about 15 per cent in order to protect national production. Observers feel that such a measure would result in substantial price increases by domestic mills. (From *Foreign Commerce Weekly*)

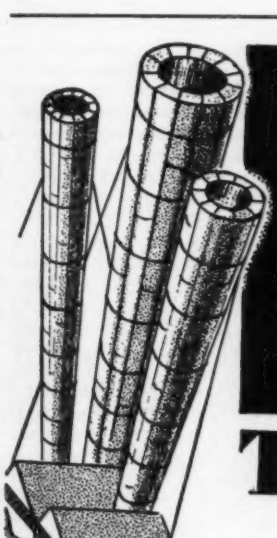
▶▶▶ ALGERIA has a new mill which is nearly completed. No information has been given out as to the capacity of the mill or the grade of paper to be made. It is, however, stated that paper will be produced from esparto grass and that the mill is located at Baba Ali. Technicians and mill equipment came from England. (From *Foreign Commerce Weekly*)

▶▶▶ THE NAPALESE Government has launched an industrial development program covering three 5-year periods which program includes a pulp and paper mill. Additional paper mills will be built during the second and third 5-year periods. (*F.C.W.*)

Recovery of Sulphur from Sulphite Waste Liquors

In the German sulphite pulp industry, about 100 thousand tons of sulphur are lost annually in the waste liquors, and studies were undertaken to determine whether this waste could in part be obviated. This article gives a comprehensive report of the work of H. Fiedler and H. Schlosser. A comprehensive survey of the literature is given, with over 60 references dealing with sulphur recoveries. The review outlines recovery by relieving the digester, by precipitation from the waste liquors and by thermal decomposition of the liquor.

In the sulphite cooking liquors magnesium bisulphite has the following advantages over calcium bisulphite: (1) Stronger liquors may be used without leading to scale formation, because of the far greater solubility of magnesium sulphite (6.14 grams per liter versus 0.043 gram per liter in the case of calcium sulphite) and because magnesium sulphate is so very soluble as compared with calcium sulphate. By this happenstance it is possible to obtain improved pulp yields by using a magnesium base, and the danger of burnt cooks usually is prevented. The great advantage, however, is the elimination of incrustation in preheaters, evaporators, and alcohol stillheads. (2) Pulps obtained with magnesium bisulphite are less colored, more easily bleached and retain at least as high a pulp quality as the pulp obtained with calcium bisulphite. (3)



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The cooking time is reduced by using magnesium bisulphite liquors. The claim also has frequently been made that magnesium bisulphite may be used in cooking woods rich in resins (e. g. the pines), red beech, and even plants high in siliceous ash like the straws, reeds, and bamboo.

Despite the fact that the usual magnesium minerals required for the sulphite cook are not available in Germany, the belief that good sulphur and magnesia recovery might both be feasible and the knowledge that magnesium sulphate was an available raw material make the magnesium bisulphite process (in Germany) a distinct possibility. The experiments described in the paper deal with: (a) the dry decomposition of waste liquor residues from calcium bisulphite cooks in the presence of inert gases, and (b) the recovery of raw materials from waste liquors as well as their preparation from magnesium sulphate.

A series of preliminary runs were made with 500 milligram samples of dried (powdered) calcium bisulphite waste liquors, by heating either in carbon dioxide or in hydrogen at temperatures ranging from 250 to 500° C; resulting gases were analyzed both for sulphur dioxide (plus sulphur trioxide) and hydrogen sulphide and the total sulphur recovery was estimated. Recovery

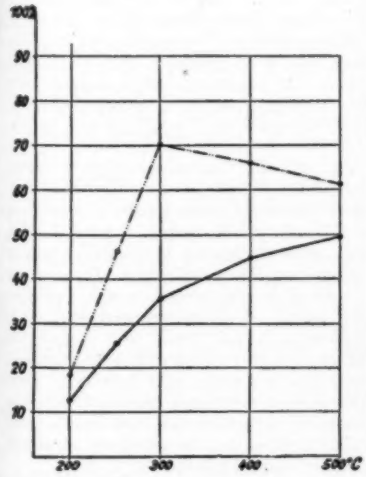

Fig. 1—Pyrolysis of powdered sulphite waste liquor in a stream of carbon dioxide. Upper Graph—Per cent recovery of sulphur (at varying temperatures). Lower graph—Per cent loss of material on heating

was highest (72% in either carbon dioxide or hydrogen) by gradual heating at 300°. This is shown in Figure 1, the upper graph. The lower graph in this same figure shows the loss in weight with rising temperature. In subsequent experiments either with larger amounts of sulphite waste liquor, or with the dried material, these recoveries were never reached.

The laboratory pyrolysis equipment is shown in Figure 2. The tube (1)—1.4 x 52 cm is wound with the electrical heating element of nichrome wire (2). Through (1) passes a conveyer screw (3) made of thin bands of iron, the shaft of which is joined through a rubber tube (4) connection, to the motor (5), the speeds of which

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TABLE I—Analysis of dry lignosulphonate (400° Pyrolysis—Sulphur Recoveries)

Total sulphur content (per cent)	Ash (per cent)	Per cent sulphur in gas	Per cent sulphur recovery	Percent orginal sulphur retained as magnesium sulphate
6.28	4.90	5.17	82.4	7.82
		4.90	79.4	3.82
6.00	5.52	4.75	77.6	1.67
6.23	5.88	4.90	78.6	1.83
5.88	5.18	4.75	79.8	2.04

can be varied. The pyrolysis tube is charged with sulphite waste liquor through the cylindrical vessel (6) by periodically raising the conically ground metal rod (7). Carbon dioxide is introduced through the inlet of T tube (8) and the rate of flow is measured and can be controlled. The gases resulting from pyrolysis are passed first through container (9) which is filled with glass wool so as to separate condensible products, and fine particles that are mechanically carried over. Wash bottles (11) and (12) contain normal sodium hydroxide solutions and bottle (13) is charged with aqueous copper sulphate to trap escaping hydrogen sulphide. (Evidently with the high concentration of carbon dioxide, hydrogen sulphide is not retained by either (11) or (12) whereas the sulphur dioxide and sulphur trioxide are absorbed quantitatively). The pyrolysis residue is conveyed to and trapped by the powder flask at the end of (1). Suction (at a pressure of 5 mm) is maintained in the system through a pump attached to (12).

Better results were obtained in thermal decomposition of waste liquors from laboratory magnesium bisulphite cooks. A preliminary series was carried out with a magnesium lignosulphonate obtained from a commercial sulphite waste liquor which was decalcified by means of ammonium carbonate. The ammonium salt was then converted (by an excess of magnesium oxide) into the corresponding magnesium salt, the aqueous solution of which was then evaporated to dryness and dried at 100° C. This residue contained 6.36% sulphur. Thermal decomposition with 500 mg each of this material were carried out at 300°, 800° and 900° C respectively. So as to insure oxidation of the elementary sulphur obtained in the pyrolysis, air (as well as carbon dioxide) was used. At 900° C, this permitted a recovery of over 95% of the sulphur originally present in the magnesium lignosulphonate. Even at 300°, the sulphur recovery was 83%. Experiments with magnesium sulphite waste liquors (in presence of air or nitrogen) gave very variable results. In no case was a 70% sulphur recovery reached at 300°. However, at 400°, with the pyrolysis carried out in the presense of air 71% sulphur was recovered in the gases, and 12.7% of the original sulphur was present in the residue (as magnesium sulphate). However, the greater part of this same residue was in the form of magnesium oxide, which could be used in the preparation of new cooking liquor. Pyrolysis at 400° in the presence of air causes a greatly reduced yield in ash (over that obtained in the presence of carbon dioxide). In another series of cooks, in which the base was low and the temperatures were at a minimum, pyrolysis of the liquor at 400° in the presence of carbon dioxide gave the optimum sulphur recovery. This is shown in the accompanying Table 1.

TABLE 2—Comparative sulphur recoveries using mixtures of waste liquor and ashwood charcoal in reduction of magnesium sulphate heptahydrate; sulphur balances

	16.5% dried spruce lignosulphonate 83.5% magnesium sulphate heptahydrate (Duplicate Runs)		10.4% charcoal 89.6% magnesium sulphate heptahydrate
Weights taken in grams	0.4993	0.5054	0.5129
Residue after pyrolysis— in grams	0.1029	0.1156	0.166
Sulphur derived from magnesium sulphate	0.0541 g	0.0546 g	0.0597 g
Sulphur derived from lignosulphonate	0.0056 g	0.0056 g	———
Total sulphur in gas	0.0488 g	0.0477 g	0.0597 g
Sulphur recovered in gas	0.0488g.	0.0477 g	0.0328 g
Sulphur recovered in residue	0.0109 g	0.0125 g	0.0269 g
% Sulphur in gas	81.7	79.2	55.0
% Sulphur in residue	18.3	21.6	45.0

The losses in the magnesium bisulphite process can be compensated for in two possible ways: (1) loss in chemicals can be made up by the reduction of the calculated amount of magnesium sulphate by means of a predetermined (minimum) weight of sulphite waste liquor or (2) a suitable amount of magnesium sulphate is added to the sulphite waste liquor prior to evaporation. In the latter case the ratio of the magnesium salt to (dry) waste liquor is about 1:3, whereas in the former case it is 3:1. The following experimental data show the possibilities of sulphur recovery: A mixture of 25.3% magnesium sulphate and 74.7% of a waste liquor (dried) containing 5.88% sulphur, was used. (Weight of mixture taken — 0.4973 grams.) Pyrolysis temperature was 800° C; time one hour. Total sulphur in mixture prior to pyrolysis — 43.7 mg (26.4 milligrams from magnesium sulphate; 17.3% from waste liquor). In the gases resulting from pyrolysis 41 mg sulphur was recoveed—i.e. 93.9% of the total sulphur. In the residual ash only 0.8% of the original sulphur remained as the magnesium sulphate. The total sulphur loss was thus only 5.3%. After a series of experiments in which attempts were made to keep the sulphite waste liquor (dry) as low as possible—(several of which resulted in low sulphur recoveries) the following results were achieved: magnesium sulphate heptahydrate (six grams) were mixed with 1.2 grams powdered waste lignosulphonate and 0.523 gram of the mixture was heated one hour at 800° leaving a residue of 90 mg (containing 3.8 mg sulphur). The sulphur recovered in the gaseous pyrolysis product was 93.1%. The ash contained 84% magnesium oxide and about 16% magnesium sulphate. In converting magnesium sulphate to magnesium oxide, with recovery of gaseous sulphur compounds (spruce), sulphite waste liquor was shown to be much more effective than is charcoal from ashwood. This is shown in Table 2.

In the former case (pyrolysis at 625°) about 80% of the sulphur was recovered in the gases. In the latter case only 55% was

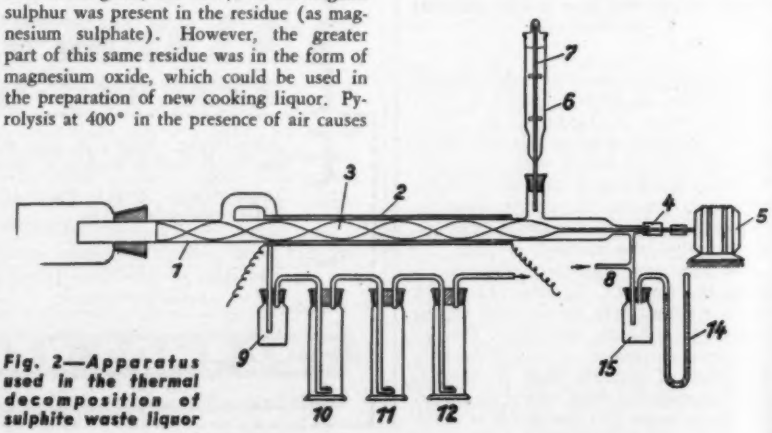


Fig. 2—Apparatus used in the thermal decomposition of sulphite waste liquor

obtained in this fraction. The better reducing action and sulphur recovery in the case of sulphite waste liquor is ascribed to the greater surface (fineness of division) of the powdered waste liquor. On heating, the latter dissolves in the water of hydration of the epsom salt, and the contact between magnesium sulphate and carbonaceous material is enhanced in this way.

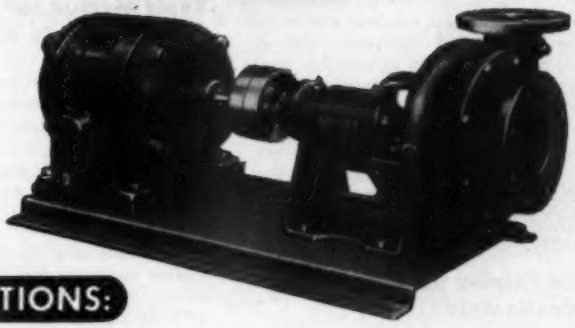
The possibility of obtaining sulphur dioxide and magnesium oxide (the two requisites in magnesium bisulphite pulping) from cheap epsom salt is, therefore, apparent. The following sequence of mill operations is suggested: The desulphuring of dried sulphite waste liquor and the reduction of magnesium sulphate may be carried out in a rotary recovery furnace, similar to that used in converting sodium sulphate to the sulphide.

The desulphuring process (of the liquor) can be carried out at 400° C. Thereupon magnesium sulphate is added in sufficient amounts to make up the magnesia losses, and the temperature of the furnace is carried up to 700°. Combustible carbonaceous materials which escape from the rotary furnace are then burned in another suitable furnace, and a part of the hot gases are passed through the rotary furnace, so as to sweep out sulphur dioxide (and other sulphur containing gases). The amount of this rinsing gas is so regulated that (a) the optimum sulphur recovery is attained and (b) that the concentration of sulphur dioxide in the gas is as high as possible. The heat derived from the combustion of the gases is utilized for the indirect heating of the rotary kiln.

Concentration of the waste liquors may be carried out in suitable vacuum evaporators with final reduction to powder in suitable spray driers (which may be heated with any excess heat from the combustion and pyrolyses outlined previously). The recovered magnesium oxide is in finely powdered form which can be used without difficulty in the production of fresh sulphite liquor. The Tomlinson equipment (U.S. Patent 2,238,456) should prove highly suitable. However, future large scale runs (in Germany) should be made to demonstrate whether magnesium sulphate can be used practically as a raw material in the production of magnesium bisulphite pulp.

In summarizing, the author states (1) that on a laboratory scale only about 70% of the sulphur in a dry calcium lignosulphonate powder can be recovered in the form of sulphur dioxide (plus sulphur trioxide) and hydrogen sulphide; (2) pulping with pure magnesium bisulphite solutions has the advantage (other than those already given in the literature) that the waste liquors may be employed in carrying out another cook, without material loss in pulp quality (or sugar yield), with a concomitant saving of heat and chemicals; (3) regeneration of magnesium sulphite waste liquors can result in a recovery of over 80% of the original sulphur in the form of sulphur dioxide and hydrogen sulphide at 400°, and well over 90% at 800°. Simultaneously over 80% of the magnesium may be recovered. Kurt Schwabe. *Holzforschung* 3, No. 1 5-23 (1948). (In German.)

NEW GOULDS Centrifugal Pumps Liquids at Low Cost



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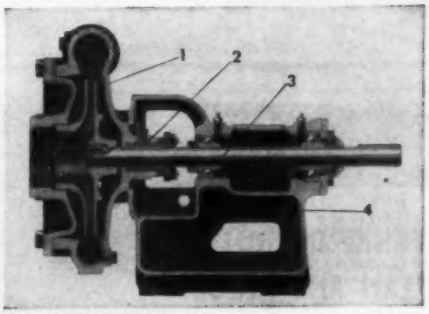

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Research in Wood Chemistry in the U.S.S.R.

This is a progress report of researches of the following agencies of the Soviet Union: —(a) Central Scientific Research Institute of Wood Chemistry; (b) all Union Research Institute on Wood Hydrolysis; (c) Leningrad Academy of Wood Technology; (d) Ural Wood Technological Institute, and of numerous other advanced institutions. The following subjects are dealt with:—turpentine, resin, wood distillation, and the hydrolysis of wood and agricultural waste products. Investigations on pulping are reserved for a future communication. Sixty-four literature references are given.

M. Ulmann, *Holzforschung* 3, 25-31 (1948). (In German) taken from a report in Russian by N. I. Nikitin, *J. Applied Chem. U.S.S.R.* (*Zhurnal Prikladnor Khimii*) 20, 1083 (1947).

Wood Pulping with Peracetic Acid

This is a preliminary communication dealing with the use of a new pulping agent. Sprucewood was heated with 10% peracetic acid at about 70° C for four hours. In one case a 56.6% pulp yield (containing 80.1% alpha cellulose, 19.2% hemicelluloses and only 0.1% lignin) was produced. The filtrates and washings from this pulp contained relatively small amounts of carbohydrates, which could be converted to reducing sugars by means of 2% sulphuric acid. During the delignification the wood sorbed about 14% of oxygen, but the sugars seemed little affected by the per-acid. Two amorphous fractions were separated from the oxidizing liquor. These are being studied further. Their methoxyl values are very low (1.55% and 1.9% respectively). A. Poljak. *Angew. Chem.* 60A, No. 2, 45-6 (1948) (In German).

Rapid Method for Estimating the Cellulose in Aspen

After discussing the time consuming methods required in the determination of "pure cellulose," the authors suggest a short cut, which, while it gives only proximate results, serves a useful purpose when a large number of aspen woods must be analyzed. Actually it is an indirect method. A 100 gram sample of barked wood (chipped and free from knots) is impregnated with 750 ml. of a liquor consisting of 2% sodium (proportioned as follows: 65% as caustic soda, 20% as sodium carbonate, and 15% as sodium sulphide). The wood is then subjected to a kraft cook under carefully controlled and well standardized conditions.

For any specific wood sample, the pulp yields were found to be sharply reproducible (within about plus or minus 0.12% of the weight of the wood). In the case of a number of samples of the *Populus species*, the kraft pulp yields varied from 51 to 62%. On the average, the pulp samples contained 0.75% ash, 0.8% extractives, 1.2% lignin, and gave rise to about 12.5% furfural. On the basis of previous, carefully-run analyses, it is assumed that the pulp yield obtained by the above procedure actually exceed the true (pure) cellulose content by 11 per cent. (In practice the variations were as great as a 7 to 12% excess). Thus a kraft determination is made and from this (oven dry yield) is subtracted 11%. Although this value may differ by several per cent from the true cellulose value in an aspen wood (as actually determined), it certainly serves in differentiating samples that are high, intermedite, or relatively low in cellulose content. Georg. Jayme and Udo Schenck. *Das Papier* 2, 323-7 (1948). (In German).

Paraffin Emulsions in Sizing Paper

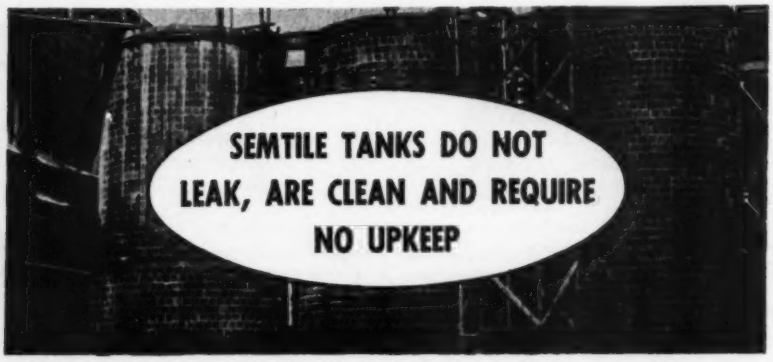
The author gives a brief description of current methods for measuring size resistance and refers to the various factors that exert an influence on sizing. In his experience paraffin-base emulsions after being heated with a protective colloid and stabilized so that the particle size remains below one micron, are very satisfactory. The nature of the protective colloid is not disclosed. Such an emulsion may be used in the form of a white gel or paste, depending on the temperature, and contains more than 25% paraffin. It is compatible with rosin size and the two may be used together.

The advantages of paraffin-base emulsions both in application and in sizing results are discussed. The author claims that the paraffin emulsions have the advantage of smaller losses in the white water, lower alum requirements, no sticking to the rolls, more uniform sizing, no dusting difficulties, improved opacity of the sheet, and no yellowing of the paper on storage. F. Stephan. *Bull. assoc. tech. ind. papetiere* 2, No. 6, 117-21, with extensive discussion 121-6 (1948) (In French).

Constituents of Douglas Fir Heartwood

Douglas fir is used extensively in the pulp and paper industry, as well as the lumber and plywood industries. The present article presents a comprehensive study of the extractives of this wood and includes the components which are soluable in ether, acetone, and finally in cold water.

Total extractives (in one sample) amounted to 9.6%. In the ether extract were found oleic, linoleic, lignoceric, and abietic acids, a phytosterol, and a tannin. The fatty acids were both "free" and combined. The tannin seems to be chemically associated with some other constituent. From the acetone extract a pentahydroxy flavanone melting about 237° C; mol. wt. 300, was isolated. (This is identical with the one recently described by Pew, *TAPPI* 32, No. 1, 39 (1949).) It is this flavanone which is such an important factor in the resistance of Douglas fir to sulphite pulping. The acetone extract also furnished a catechol tannin and a phlobaphene probably structurally related to the flavanone. About 80% of a water soluble extractive was shown to be galactan. H. M. Graham and E. F. Kurth. *Ind. Eng. Chem.* 41, No. 2, 409-14 (1949).



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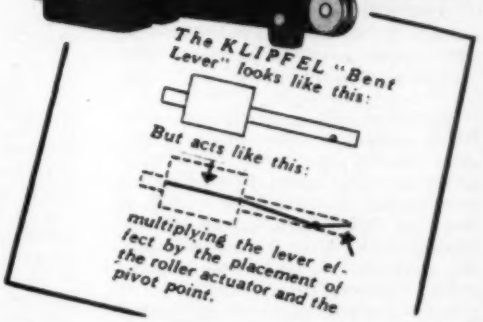
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500	Al. Chlrs.	ANY	2300	514
400	Gen. Elec.	IM	2300	900
300	Westghse.	CW	2300	367
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350	Westghse.	CS	2200	1800
250	Gen. Elec.	IK	2300	600
200	Westghse.	CS	440	720
150	Gen. Elec.	KT	2300	600
100	Al. Chlrs.	AR	440	514
75	Al. Chlrs.	AN	440	1200
60	Gen. Elec.	K	440	1800
50	Westghse.	TEFC	440	1200
40	Gen. Elec.	KT	440	3600
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Convention Papers . . . Abridged

Choosing the Correct Mechanical Transmission Method[1]

WILLIAM STANIAR
Consulting Engineer[2]

Choosing the correct mechanical transmission method is of vital importance not only to the pulp and paper industry but to all industry.

Efficient operation of any industrial plant is possible only when the correct methods of transmitting power mechanically are employed. In the operation of your particular plant there is nothing of greater importance than your mechanical power transmission, since without it there would be no operation.

Selection of engineering equipment of any kind is frequently difficult because of a similarity of basic characteristics. This basic similarity prevails in the various methods used for transmitting power mechanically.

The correct and economical solution of driving problems is dependent upon a realization that (1) mechanical power transmission is a most important subject because of its necessity in most all industrial operations; (2) its primary requisites must be understood; and (3) unless the most adaptable equipment and methods are used for modern operating requirements, loss of power, loss of production, and high maintenance costs result.

The primary requisites are (1) that mechanical power transmission is a definite engineering project and not simply an auxiliary; (2) that it is composed of two general systems; (3) that each system is composed of several methods; (4) that each method is composed of a number of accessories; and (5) that each method of each system is adaptable for a definite purpose.

Mechanically, modern operating requirements involve high velocity ratios, compactness, variation of applied speed, rigidity or flexibility, high starting torque resistance, shock and vibration, overload release, and lubrication. *Atmospherically,* they involve the destructive action of acids and acid fumes, the abrasive damage of various dusts, and the deteriorating effects of high temperatures and excessive moisture.

Modern mechanical power application must, of necessity, be divided into two general systems—the "flexible" and the "rigid," and each system further divided into various methods. These divisions tend to avoid wrong selection of driving method, wrong arrangement of the method selected, and faulty cure and lubrication of the transmission accessories involved. The losses experienced in the accessories of the method applied are generally the effect and not the cause of the trouble.

When choosing the correct transmission method it is of primary importance to decide which general system is most applicable to the kind of load and the driven equipment. This is forcefully demonstrated by the following experience:

A ball mill containing 40,000 lb of steel balls and 12,000 lb of ore was driven by a 250 hp at 500 rpm synchronous motor, flexible coupled at a 450 hp, 2.7 to 1 ratio herringbone gear unit rigidly coupled to the pinion shaft of the mill. A forged steel cut-spur pinion, 14 in pd by 1½ pd by 13 in face, operating at 185 rpm, meshed with a split cut cast iron ring gear, 123 in pd by 1½ dp by 13 in face, bolted to the shell of the mill. The mill operated at 21 rpm. The herringbone gear unit was designed for 450 hp to accommodate the heavy starting torque load of the ball mill. Such an assembly resulted in the rigid system of transmission and supposedly was correct and ideal. Trouble was experienced immediately. The bronze sleeve type bearings on the slow speed shaft and the outer races of the Timken bearings on the high speed shaft of the gear reduction unit failed, the foundations supporting the pinion shaft bearing base plate cracked, and finally, the pinion shaft bearings were torn loose from the base plate.

The case was perplexing since after each failure and repair, the alignment and setting of the entire installation were thoroughly checked. The final diagnosis and subsequent correction proved, that in view of the character of the load and the integral spur gearing of the ball mill, the rigid system of transmission had been misapplied. Severe shock and continuous vibration were caused by heavy starting torque conditions, the cascading action of the balls in the mill, and the tooth backlash of the spur pinion and ring gear.

The difficulty was overcome by substituting a 450 hp, pump-lubricated, silent chain drive of 2 in pitch by 18 in width for the herringbone gear unit as a connection between the motor and pinion shaft of the mill. It is evident that the shocks and vibration generated by the ball mill and its integral spur gearing were being absorbed and dissipated by the flexible chain connection, since the installation, operating 24 hrs per day for the past ten years, has given satisfaction with low maintenance. An experience of this character is proof that fundamentally the success or failure of a transmission installation depends upon the system selected.

Flexible System Methods

1. Modern group—belting, chain
2. Flat belt, direct
3. Chain, direct
4. V-belt
5. Pivoted motor base

Methods of this system are shock absorbing and tend to reduce the effect of load impact and vibration. Certain methods of this system prosses an inherent characteristic of "slip" which in some installations is necessary.

Rigid System Methods

1. Direct coupled motor
2. All types of gear reduction units
3. Motorized gear units
4. Open gearing

Methods of this system localize shock and vibration which must be taken by the transmission and driven equipment. Sudden obstruction in the driven equipment causes destructive shock to any rigid method of driving.

In view of similarity of application for certain methods of both the flexible and rigid systems, parallel situations can be simplified by generalizations:

1. High starting torque — injurious to any method unless relieved electrically or by mechanical means interposed between prime mover and load.
2. Low or moderate starting torque—controllable by friction clutch or tight and loose pulleys. Any method of either the flexible or rigid system is suitable for this condition.
3. Power requirements — fundamental basis for decision between group drive and direct connection unless only one or two driven units are involved and the ratio of speed application is high.
4. Intermittent or steady load—methods of the flexible system are more adaptable to intermittent or fluctuating loads, while those of the rigid system are more suitable for steady loads.
5. Frequent starting and stopping—injurious to methods of the rigid system if high starting torque is involved and the power is high. Methods of the flexible system are more capable of absorbing such shocks.
6. "Across-the-line" or compensator start motors—starting torque should control this selection.
7. Dust, corrosive fumes, flammable vapors—dust of the abrasive type and corrosive fumes are injurious to any method of transmission, therefore, under these conditions methods capable of perfect enclosure should be used. Where flammable vapors exist the hazard of static electricity and frictional heat must be considered.

Flexible Methods

Modern Group—Belting or Chain

These two methods are similar with the exception that one employs belting from line shaft to driven equipment, while the other employs chain. Whether to use belting or chain can be determined thus: (1) use chain when the speed is low and the power pull heavy; (2) use chain, clutch controlled, when load and speed require belting over 8 in wide since belting beyond this width is difficult to shift; (3) use chain when the starting torque is above moderate as excessive starting slippage is destructive to all belting types; (4) use chain where atmospheric conditions are severe since dust and fumetight self-lubricating enclosure is possible. The belting group method is applicable to both production shop and process plant operation for the driving of batteries of machines when the individual machine running load does not exceed 5 to 7 hp. Economically the prime mover should not exceed 50 hp. For chain, the individual apparatus load should not exceed 10 hp and the prime mover, 75 hp.

Flat Power Belting

Flat belting when correctly selected as to type, width, and thickness for the mechanical and atmospheric requirements results in power transmission economy.

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(1) Abridged from paper presented at TAPPI Meeting, Watertown, New York, October 14, 1948.

(2) Formerly mechanical power engineer for E. I. du Pont de Nemours & Company.

There are seven distinct types of belting: leather, rubber, stitched canvas, solid woven cotton, camel's hair, Balata, and Teon. Each type possesses definite characteristics and fulfills a need in industry.

There are four types of leather belting: nonwaterproof oak tanned, waterproof oak tanned, waterproof mineral retanned, and waterproof combination tannage.

Nonwaterproof oak is fabricated with a glue soluble in water and should only be used where moisture of any kind does not exist.

Waterproof oak is fabricated with a pyroxylin cement insoluble in water, thus permitting its use in moisture conditions.

Waterproof mineral retanned is fabricated with a pyroxylin cement insoluble in water and the leather is treated to resist corrosive acid fumes. This type possesses a high co-efficient of friction and is especially adaptable for high speed small pulley applications.

Waterproof combination tannage is fabricated with a pyroxylin cement insoluble in water. It is composed of one ply of mineral retanned and one ply of oak tanned leather. Its chief use is for heavy loadshifter drives since the mineral retanned ply which operates next to the pulley furnishes a high co-efficient of friction and the oak ply resists the transverse crumpling action of the shifter forks.

Chain Direct

This method is applicable for the direct driving of line- or head-shafts and various types of machines and apparatus from motors operating at standard synchronous speeds from 720 to 1800 rpm. For low power requirements, such as fractional to 3 hp, motor speeds of 3600 rpm are practicable. This method requires either the silent or the finished steel roller chain, the choice being dependent upon speed, power, and the mechanical conditions involved. Where flexibility, positive velocity ratio, and very short centers are needed, this method should be employed. Shock loads, severe vibration, and the problem of positive speed differential can be solved by the use of chain connection.

V-Belt

This method is applicable to either production shop or process plant short center driving of shafting and various types of industrial equipment. For the driving of machinery where the absence of chatter is desirable it is of particular advantage. The locking effect developed as the V-belt seats itself in the groove of the sheave results in certain advantages: (1) short center distance with ratios up to 8 to 1; (2) ability to absorb shock and pulsating loads; (3) low maintenance; and (4) the possibility of use on medium center drives. The V-belt drive must have center adjustment and it should be protected from acids, mineral oil, and grease. The factors which favor chain direct over V-belt are: (1) shorter center distance for equal ratio; (2) possibility of fixed centers; (3) positive driving; (4) ratios up to 12 to 1; and (5) severe atmospheric conditions and abnormal temperatures.

Pivoted Motor Base

This is an efficient flexible method particularly when leather of the retanned type, made endless, is used. A particular advantage is automatic belt tensioning which accommodates belt stretch, contrifugal tension, and load fluctuations. This method requires very little manual adjustment and is practicable for ratios up to 7 to 1. The chief characteristics which give this drive an advantage over other short center methods are: (1) its efficiency is maintained at peak loads; (2) it automatically synchronizes belt tension to load requirements; (3) it overcomes centrifugal tension; (4) normal belt elongation adjustment is automatic; and (5) it possesses high power capacity.

A particular advantage of the pivoted motor base drive when equipped with the correct type of leather belt, is its sustained efficiency of 96 to 98 per cent. Since efficiency is the ratio of power input to power output of a drive, any increase in efficiency is an actual saving of dollars and cents in power costs.

As an example, assume a 150 hp motor connected to a piece of equipment through a drive having an efficiency of 97 per cent. The 5 per cent difference in efficiency is a power saving.

Assume the power cost to be 25c per hp per day: 150 hp at 25c per hp per day = $37.50 per day. Operating 300 days per year—300 × $37.50 = $11,250. $11,250 × 5 per cent = $562.50 saving per year.

Rigid Methods

Direct Coupled Motor

This is direct connection in its fullest sense and generally signifies integral motor mounting with machine speed that of the motor. The motor should be flexible coupled to the driven machine. The selection factors for this method are: (1) the input speed of the driven equipment must correspond with that of the motor; and (2) consideration must be given to starting torque. If starting torque is high the motor should be of the correct type, or a special mechanical device should be used between motor and machine.

Worm-Gear Reduction Unit

Adaptable for both vertical and horizontal driving, this method can be used for moderate and low output speeds. The factors governing selections are: (1) high ratio possibilities in small space; (2) operation at high input speeds; (3) continuous load bearing capacity; (4) quietness of operation; and (5) transmission of power at right angles. It is adaptable for fractional hp requirements and for heavy work. Permissible worm speeds range from 100 to 4,000 rpm with ratios up to 100 to 1 for single reduction and 10,000 to 1 for compound reduction. In single reduction the worm and worm gear possess higher ratio capacity than any other form of gearing. At the higher ratios, however, the efficiency is reduced. Although much higher ratios are possible with the compound units, the hp capacities are relatively low since the torque for a given hp varies inversely with the speed. In view of this fact the single reduction has a larger field in general industrial operations.

Herringbone Gear Reduction Unit

This method is available in single, double, or triple reduction with shafts in line or offset and maximum ratios of 10 to 1, 70 to 1, and 320 to 1, respectively. The power range for the single and double reduction in standard units is 1½ to 1300 hp. The triple standard reduction unit is available up to 75 hp. The factors which influence choice are: (1) continuous, smooth, noiseless action of gears (two teeth always having two points of contact in the plane of axis); (2) great strength; (3) elimination of back lash; (4) large power capacity through comparatively small gears; (5) high peripheral speeds with no end thrust; and (6) the ability to carry heavy overhung loads.

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Motorized Gear Unit

Motor and gear assembly are combined in one unit. It is available with motor supported and gear unit overhung, with gear unit supported and motor overhung, and with both motor and gear unit supported. Choice of construction is a matter of opinion since all three are built substantially. The planetary and helical gear assemblies are most generally employed. The advantages are: (1) elimination of base plate and flexible coupling; (2) compactness, resulting in high ratio direct connection in small space; (3) permanent alignment of motor and reducer; (4) efficiencies equal to that of the gear assemblies employed; (5) accessibility of motor and reducer parts; (6) AC motors of any type can be employed; (7) ideal for both vertical and horizontal driving.

The motorized unit should not be used where (1) it is preferable to have the motor separate from the reducer in the event of motor trouble; (2) the power requirement exceeds 75 hp; (3) the ratio requirement exceeds 180 to 1; (4) the ratio is low and the power high; (5) where shock or high starting torque loads exist; and (6) where right angle driving is necessary.

Open Gearing

This method is a direct connection and speed reduction arrangement between motor and driven equipment is becoming obsolete because of its inferiority to the modern rigid and flexible methods. Its use is now almost solely confined to secondary reductions since by this means a lower ratio reduction unit can be employed. Cut tooth open gearing is usually used in conjunction with mechanisms of machines and for heavy loads at extremely slow speeds.

Group Versus Individual Motor Drive

In choosing between group and individual driving in industrial operations the governing factors are (1) power requirements, (2) arrangement of apparatus, (3) character of load, and (4) atmospheric conditions. Group driving by either belting or chain is economical from a power, maintenance, and first cost standpoint.

Group driving is power economy in that motorization can be based on a sum of the driven equipment running loads, whereas individual motorization must be based on the starting load of each machine. Direct motorization of small equipment tends to affect power factor adversely since motors direct connected generally operate below their rated capacity.

Acceleration of Heavy Inertia Loads

This is the most troublesome problem in mechanical power application by any method. It is termed "High Starting Torque." The force required to translate a body from a state of rest to one of motion depends upon two factors: the weight or mass of the body, and the rate of acceleration. This law applies to bringing machinery into rotary motion as well as to moving an object along a straight line. Power to start loads of the character must be applied gradually to avoid abuse or destruction of the driving mechanism and the driven equipment.

Direct connecting a motor to a machine, particularly where high velocity ratios are concerned, usually necessitates methods of the rigid system. Because of the absence of mechanical slip with such methods, the motor is required to come to full speed under the applied torque of the driven machine. If the torque is severe, destruction strains are set up in both the driving and driven equipment, unless relieved electrically or mechanically. It is economically desirable to use standard induction motors with across-the-line start, thus permitting the motor to come to full torque speed in a few seconds. If the applied load is heavy and the motor is of the squirrel cage across-the-line start type, rigidly coupled, it must come to full torque speed under the load torque.

Slip-ring motors and their starting equipment are expensive. They can be eliminated for high starting torque service by a mechanical device known as the "mechanical slip-ring starter." This unit can be used as a direct connection coupling possessing flexible qualities or as an integral part of a pulley, sprocket, gear, or sheave. By means of slipping friction it automatically starts machinery smoothly and with uniform acceleration. This device is inherently a limit torque coupling; it will not transmit to the driven machine nor impose on the motor more than the maximum load for which it is designed. The mechanical slip-ring starter permits rating motors at the running instead of the starting load of the driven equipment, it permits the use of standard squirrel cage motors across-the-line started for accelerating high starting torque loads, and furnishes a positive overload release in the event of a jamming or stalling of the driven equipment.

The ability to choose the correct mechanical transmission system and method is valuable to the plant engineer and subsequently to his management since upon the choice depends, to a considerable extent, operating profit or loss. Profits to any industrial organization are internal as well as external, therefore, as long as the importance of the mechanical link in the power chain from generation to application is disregarded by engineers and executives it will continue to be a waster of power, which is money, and a brake on production efficiency.

Industry's Technical Manpower*

A. C. MONTEITH, Vice President
Westinghouse Electric Corporation

Your industry has changed from one having mills producing less than 50 tons per day using small machines running at low speed to one using modern equipment producing ten times as much material on machines up to 20 ft wide and operating at speeds as high as 2000 ft per minute. You have adapted electronic regulators, individually-powered paper-machine sections, even individual generators for individual sections in some cases; new and modernized drives, fine new power houses, new stock preparation, hydraulic barking, and so on.

Now what? With fine new or modernized plants, your problems are over. You can sit back, admire your new production facilities as they whirl along, and count the rolls of paper as they pursue each other off your production lines, adequate in volume and grade to meet the needs of this nation. Or can you? Of course not. Without problems this convention would have only social justification. Certainly I can think of one problem—and it is summed up by a single three-letter word—men. I know because my company, too, has been looking this one in the eye across the scrimmage line.

I hardly need remind you that during the several war years, not only was the supply of new, young men dried up, but also your industry and ours lost many valuable men into the services, and many never returned.

This shortage was aggravated by the expansion program. The need for trained men suddenly became greater at a time when the supply was lowest. Skilled men, like goods, were in short supply.

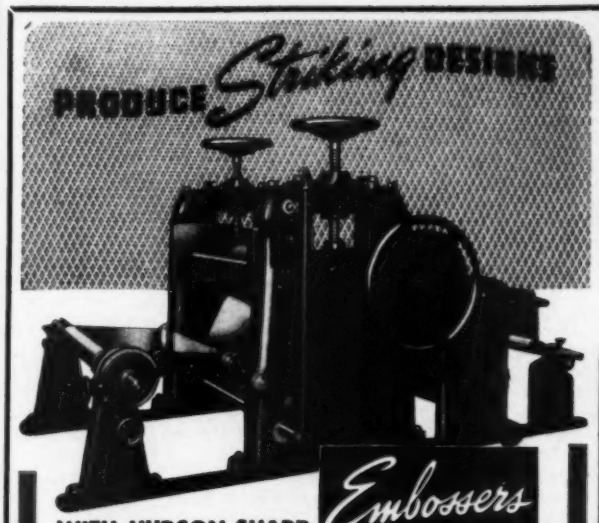
But this is not all. This very modernization program which you have executed so brilliantly has called not for just more men, but for a different grade of men. The new processes you have put into effect, the new devices you have purchased, the higher speeds, the new standards of quality, the new varieties of products demand new skills. To plan all these, to operate them, and to care for them require men trained in the new fields of chemistry, better trained mechanical engineers, and electrical engineers. You must have men to whom vacuum tubes and electronic circuits are no mystery. The days are gone when one man runs the show—active as plant manager, production supervisor, master mechanic, and general-what-have-you. And for the most part, his place must be taken by technical men trained for your kind of operations.

In the last three years Westinghouse has interviewed over 15,000 technically trained students in its efforts to meet its own needs —about half mechanicals and half electricals. In this we have discovered an alarming fact. For every one that manifests interest in electric power as a future, two students are interested in electronics and communications. The need of our company is more like 10 men who are interested in power to one in electronics or communications. Two factors contribute to this disturbing spread between supply and demand: the prominence given to communication and electronic devices by the war, and second, the glamorizing of electronics as the future key to the solution of practically all problems. Electronics, television, atomic physics, jet propulsion, become the hero vocations for many ambitious youths.

Electric power and papermaking are both old industries. They lack luster by comparison with these newcomers. If you and we are to compete successfully with them for the attention of the new generation of graduates, we must do something positive about setting forth the opportunities, the unsolved problems, the fascinating ventures that lie ahead in the more stable fields. A selling job must be done. At Westinghouse we adopted a multi-point program with the objective of obtaining good young men to keep our organization virile and progressive.

First, we determined not to be backward in telling about what electric power has to offer. We decided not to let some of the events of the past 15 years shake our faith in our industry. Any lack of faith in our-

(*) Abridged from paper delivered before the Third Engineering Conference of TAPPI, Held in Buffalo, N. Y., October 25-28, 1948.



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selves we were sure would be both unjustified and would wreck our efforts to sell ourselves to those surveying the fields for their future jobs. Young men are very quick to sense any uncertainty. Our business is old and solidly established, but that very stability has much to attract young men planning their future. Beyond that, our industry—and yours equally so—has an assured future of growth not exceeded even by the younger and seemingly more colorful fields. Furthermore, it is chuck-full of unsolved problems, new developments, new uses for our products. We are still operating on the straight-line portion of the opportunity curve. We believe it heartily ourselves and we set out to establish that fact with students. Sometimes the answer is simpler than anticipated and you will never know until you press your point.

Second, we determined to work closely with schools. If they know our problems, they can program their work to turn out a more acceptable product.

The schools should, we believe, be asked to concentrate on fundamentals. This is even more essential as the industry expands in new directions. Industry should assume the responsibility of orienting the man into its business, of providing the specialized training. If we accept this responsibility of specializing the student, the schools can dwell on fundamentals. The schools should turn out engineers, not specialists. The field has become too broad to expect specialization in the undergraduate training. With this understanding, the schools would have a better opportunity to give good courses in engineering fundamentals in four years.

Next, we recognize we must be willing to supply some professors of high caliber, who have practical experience and can guide a course in fundamentals to meet our needs. To lose a good man to academic work is often a painful loss at the time, but it is one way to help in a practical manner.

Furthermore, we have determined to maintain continuing contact with professors. This can be done through summer employment and providing classroom material helpful in teaching a live and timely course. The summer pay need not be high, but just sufficient to defray the expenses of the man while he is away from his normal location; and the classroom material should simply be information that the professor can integrate into his course as practical examples of the use of fundamentals. A number of professors spent last summer at Westinghouse, doing specific work.

To hold a professor's interest, he must be given responsibility on his assignments. Kibitzing soon becomes monotonous. Working assignments, of course, bring him into contact with but a limited part of the field. To fill the need of a broader grasp of our problems, a seminar was arranged. This seminar was conducted by our best experts in their respective fields. We outlined what we did with the schools' products after they came with us and also presented some of the technical and industrial relations problems that are before us. This gave opportunity to discuss the mutual problem of curriculum with the professors, allowing us to formulate our course to fit in with the work being done by the schools. Furthermore, it gave the professors an opportunity to see the living problems of industry. It also brought the professors from many schools together, allowing them to interchange ideas on their immediate problems. We received very favorable reactions from those participating, both our people and professors, and it is our intention to continue this program.

Prominent men in the industry should be encouraged to talk to student bodies. Many schools welcome this, provided, of course, the material presented is a good, fundamental discussion. Also, opportunities present themselves to talk to student branches of A.S.M.E. and A.I.E.E. and A.C.S. The students are anxious about developments in industry for which they are training.

It is desirable to have good, modern equipment in colleges for training purposes. Westinghouse has installed over 25 steam laboratories and over 100 electronics sets in technical schools, at a special price. The electronic equipment was planned purposely to illustrate both industrial and power types of equipment to show the students that the power field is a broad one, and that it has within it much of the glamorized electronics equipment.

Summer work for the student following the junior year is very valuable. It brings him into contact with the industry and prepares him in a practical way for his final year of formal education. He sees the end use of his training and therefore can assimilate better the more advanced fundamentals presented to him. There is one *must* in this plan. His supervisor *must* be someone who will see that he gets interesting work. Making him a file clerk or a leg man can easily discourage him with engineering. We recognize that we are educating a potential ambassador back on the campus for our industry.

We are encouraging inspection trips through our nearby plants by students during their junior and senior years. This helps the man orient himself.

Third, we have found that having a definite training program for orienting graduate engineers into industry has been as strong a selling point in our sincerity as any factor in the program. Some might feel that only a large company can afford a training program. A program can be set down for a company employing only five men a year as well as for a large company. It would be on a less pretentious scale but due to the close personal contact between the experienced personnel and the student it would be a better program than when there are a large number of students.

One fact stands out in making a graduate student training program effective. The most experienced men must understand the need for them to take time out to work with the embryo engineers. If this is not done, the young men soon pass the fact along to the next year's class and we not only lose the man but the chance of securing more. The personnel people can organize a course but its success lies with those experienced engineers who must conduct it.

Lastly, the young man should not be forgotten by the training department once he has taken a permanent position in the company. The best young men do not have to be told that education is a journey, not a destination. We have found that the better men are quite desirous of continuing some form of advanced education. Some twenty years ago we worked out a scheme with the University of Pittsburgh, whereby a man in any of our Pittsburgh area plants can learn while he earns. The man takes class work while still on the training course and at night on subjects and with lecturers approved for graduate degree credit by the University of Pittsburgh. He can take a limited number of credits toward an advanced degree from Westinghouse lecturers and the remainder must be taken on campus.

The plan has been extended to our other plant cities and with other innovations. Over 500 of our men are registered for such work this year. Over 150 Westinghouse men have taken advanced degrees through this plan.

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We also find many men taking the classes for their own edification and not for credit. Every undergraduate is not a candidate for graduate work. As a matter of fact, many are not interested or have the inclination, but many do like to take some advanced work to help them in their immediate work. One of the main advantages to this plan is that the man takes specialized work of immediate interest and can observe industry at the same time.

We have found this plan one of the best drawing cards for good men. We do not advocate this to the exclusion of the man staying at school for an advanced degree if the man can afford such or if he wins a fellowship. We have between 30 and 40 fellowships annually at different schools to encourage advanced education. The plan does afford an opportunity for advanced education to many who cannot afford it or who do not see the desirability of such until they get into industry.

In following the man after final placement in a permanent job, the last but most important thing is to see that he is placed with an experienced man who has an interest in young men and who will impart to him the challenges in the industry rather than the point of view of the fellow over the hill who is just eking out an existence. Let us be sure the young man gets the proper perspective and as that develops we keep moving his horizons farther out so he will not lose interest. It is inherent in a good man that he wants work with responsibility increasing with his growth in stature. This is the most important point in the development of men. Each of us can probably recall someone who gave us an invaluable lift as we progressed.

You and I are identified with great industries with bright and definite futures. Their success lies with the men we attract. The difference in men makes the difference between a decadent industry and a progressive industry. We must all assume our full responsibility of interesting, training, and securing good men for our industry. Men are the key to the success of any industry.

Electronic Speed Regulators for Sectional Paper Machine*

V. B. BAKER[1] and C. F. KOVALSKY[2]

The drive for a paper forming machine is unique in that it must meet extremely rigid operating requirements not generally encountered on any other industrial machine. Control and regulation of the machine as a unit and of its components must be provided to a degree of refinement uncommon on machines of such huge proportions. The type and character of the loads vary widely. Continuity of service on a twenty-four-hour day, seven-day week basis is imperative.

Operation of the entire process from preparation of the raw material to finishing and shipping room activities are contingent upon uninterrupted production of paper from the paper forming machine. All processes leading up to the machine have multiple facilities whereas the paper machine is a bottleneck and sets the pace for the entire mill. When the paper machine is down, it is not long before the whole mill is down. Hence, in addition to the requirements for the highest quality of performance, the drive equipment must also possess a reliability far greater than is required of the average electrical drive.

Control for modern paper machine drives includes industrial type electronic devices that not only meet the stringent operating requirements but also provide several important advantages over the control elements which they replace. Instantaneous response is inherent and extremely high amplification, where required, can be obtained without delicate mechanical adjustment. There are no moving or wearing parts. Initial adjustments are not subject to change over long operating periods. Optimum performance can be obtained with relatively low maintenance. These features are all an integral part of a new all-electronic speed regulator designed exclusively for paper machine drives.

The operation of the various sections must be co-ordinated and their speeds synchronized to form a single continuous process.

(*) Abridged from paper presented at the general meeting of American Institute of Electrical Engineers, held in Milwaukee, Wis., October 18-22, 1948.

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(2) Electronic Control Engineering, Westinghouse Electric Corporation, Buffalo, N. Y.

However, the speeds of adjacent sections cannot bear a fixed relation but must be adjustable to meet the draw requirements for different types and grades of paper. Draw is the small difference in linear speed between adjacent sections usually resulting in a slight stretching of the sheet. Moreover, section speeds, when once set for a specific production run, must be held constant regardless of load changes or other system disturbances in order to maintain uniform draws. Constant speed on each section of the machine under all conditions is essential to insure a high quality of product which can result only if the paper machine drive provides a uniform operating speed of the machine as a whole and accurately maintained draws between sections.

The two principal types of drives for paper machines are the mechanical or line-shaft drive and the sectional electric drive. The latter type consists of individual drive motors applied to each section of the machine requiring independent draw control. All sections of the machine must operate as independent units; the only mechanical link between sections is the sheet itself. Modern high speed machines may have a total of more than 2000 hp or applied motors with some individual sections having as much as a single 500 hp drive. Sectional electric drive has been applied to a large number of paper machines of all types. It provides improved operating practices, low maintenance, accurately maintained draws, requires a minimum of space about the machine, and permits the application of almost unlimited horsepower per section without undue complication.

Present forms of sectional electric drive include the single generator system and the multiple generator system. In the single generator system, one generator supplies power to all of the section drive motors. A separate momentarily rated generator is included for starting and accelerating service and for inching the various sections as required during operations such as felt or wire replacement and wash-up. The operating speed of the whole machine is controlled by adjusting the main generator voltage and individual section speed is regulated by controlling the excitation of each section motor shunt field.

The multiple generator system includes individual generators for each section motor and suitable control for each generator. Over-all machine speed is adjusted by changing a master reference voltage which is part of the regulating system. Section speed is regulated by controlling the excitation of the individual generators.

Regulation

Earlier designs of section regulators were primarily position regulators and employed some form of mechanical speed differential. Due to numerous moving and wearing parts, these drives all required strict adherence to a careful maintenance schedule in order to realize optimum performance. The all-electronic regulator as incorporated in one manufacturer's design eliminates the mechanical differential as well as all other moving and wearing parts of the former designs. Moreover, it provides all of the features of high sensitivity, quick response, and effective antihunting essential to the proper operation of sectional paper machine drives.

After considerable analysis and actual field tests, it was determined that a high-accuracy speed regulator could meet the operating requirements. Such a speed regulator permits the use of a simple draw adjusting device consisting of a small potentiometer instead of a mechanical differential and cone pulley assembly as required with a position regulator. Quicker response can be obtained and a speed regulated system generally requires less complicated stabilizing elements.

Use of electronics in a high accuracy speed regulator for sectional electric drive was a natural outgrowth of many years of experience. The merits of electronic regulators for paper mill service have been demonstrated by the excellent service records compiled over long periods of operation as voltage regulators for sectional drive and speed regulators for single motor drives. Extremely quick response, the aim for simplicity of over-all design and the availability of time-tested electronic components led to the development of an all-electronic system of section speed regulation.

Single Generator System

In this system, a single generator furnishes power to all section driving motor armatures. The regulators for all of the individual sections are located in a common cubicle. The paper machine speed range of say 6 to 1 is obtained by changing the armature voltage on all sections simultaneously by varying the running generator voltage. The speed changes resulting from necessary draw adjustments or variation in section load are obtained by motor field control provided in the electronic speed regulator. The complete section control includes the speed regulator, a speed indicating tachometer, magnetic control and the operator's control station. Components which are common to all sections include electronic voltage regulators for the running generator and constant voltage exciter, master magnetic control, statically regulated master reference, and speed control for the over-all machine.

The a-c reference voltage regulator is a fully static device, unaffected by changes of voltage or frequency in the mill supply, and provides a master reference voltage to which the voltages proportional to speeds of all individual sections are matched. This master voltage is varied by means of a motor operated rheostat to provide the desired paper machine speed. The operating speed of this rheostat is adjusted to give a rate of acceleration commensurate with the section having the highest inertia.

Indication of section operating speed is obtained from an inductor type a-c tachometer generator directly driven from each section. This tachometer is usually driven from a high speed shaft extension of the speed reducer. Experience with d-c tachometers indicated that any d-c commutation device in the regulating system is undesirable because of the necessary frequent maintenance, variable brush drop, and the inability to isolate the long conduit runs from the section drive location to the regulator location. For these reasons, a rugged a-c tachometer generator was designed for indication of section operating speed.

Starting and inching of each section is obtained on the starting generator bus and during these operations, the electronic regulator supplies full field excitation to the section motors. The low initial voltage of the starting generator is automatically adjusted to meet the starting torque requirements of the individual section. When starting an individual section, the motor is connected to the starting generator and the excitation of this generator is then increased at a controlled rate to accelerate the section motor at the maximum permissible

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rate. A Rototrol regulator provides this current-limit accelerating feature. When the starting and the running generator voltages are equal, the electronic speed regulator then takes control, after which the section is transferred to the running generator with a minimum of disturbance to the system.

In the operation of a typical section speed regulator, a signal from the statically regulated master reference and a similar signal from the section tachometer are balanced against each other in an error detecting circuit. The difference or error voltage is amplified and used to control the three phase controlled rectifier which furnishes excitation to the motor shunt field. The circuit is so adjusted that the two signal voltages are balanced when the section is running at its normal operating speed. Under these conditions, the electronic exciter supplies the required excitation to the motor for normal speed.

The control station for each section is located on the tending side of the machine in a position convenient for the operator. It contains start, stop, and inch pushbuttons and draw adjusting rheostat as well as a load indicating ammeter. On the calender sections, inch-reverse and slack-take-up are also included.

A master control station provides for preset and manual paper machine speed adjustment, machine speed indication and a master stop pushbutton.

Multiple Generator System

In this system individual generators are used to furnish power to each of the section driving motors. The complete section control includes the speed regulator, a speed indicating tachometer, magnetic control and the operator's control station. A master cubicle contains an electronic voltage regulator for the constant voltage exciter, control for all motor and a-c tachometer fields, statically regulated master reference source and motor operated rheostat for controlling speed of the over-all machine. The master reference section a-c tachometers, section control stations, and master control station are the same as those used with the single generator system.

The multiple generator system offers distinct advantages over the single generator system. The applied armature voltage to each section drive motor is correct for all productive speeds of the machine. Because of this fact standard motor frame sizes may be used regardless of the productive speed range. More important from the standpoint of performance, speed regulation of the individual drive by control of applied armature voltage rather than shunt field excitation of the section motors affords greater stability over much wider operating speed ranges. Speed ranges of 10 to 1 are easily handled. Moreover, since shunt field excitation is constant, regulation is obtained at no sacrifice in motor torque per ampere. Thus, better response is obtained with a narrower range regulator than is required with the single generator system. Since each section control is self-contained in its own totally enclosed cubicle, no interconnecting heavy bus system or elaborate interlocking of sequencing controls common to all sections are required.

With the multiple generator system, acceleration under current limit control and deceleration with controlled regenerative braking as well as inching both forward and reverse and wash-up speed are all obtained with the electronic control. The only magnetic devices necessary are the overload relay and the main line contactor which serves as a circuit interrupting device for protection of equipment and personnel.

Electronic Circuits

The error detector element of the electronic regulator is shown in block form in Figures 5 and 8. A simplified schematic of this error detector is shown in Figure 9. This element of the regulator consists of two input transformers, a twin triode tube, capacitors, resistors and other components required for the d-c power supply.

The master speed control rheostat, together with the draw adjusting potentiometer are set to provide a 60 cycle reference voltage corresponding to the desired speed for the section. This voltage is applied to the grid of one of the sections of the twin triode tube. Pulsating d-c voltages appearing across the two cathode resistors are proportional to the a-c signal voltages. When the tachometer and reference voltages are equal, the current through the two sections of the tube are equal and the voltage output of the error detector is zero. The pulsating d-c voltages are filtered, then compared and the difference voltage again filtered to provide a d-c error voltage which is proportional to the deviation from the desired speed of the section motor. The error signal is modified in value depending upon its rate of change. This provides a field forcing action for rapid changes in section motor speed.

Use of the isolating transformers precludes the possibility of erratic performance which might result from leakage currents or spurious magnetic fields in or around the long conduit runs from the section drive location and the regulator cubicle. As a further precaution, internal impedances are kept as low as possible.

The voltage amplifier shown in Figure 10 is two stage direct coupled consisting of two twin triode tubes, resistors, capacitors and other components as required for the d-c power supply.

The d-c error signal from the error detector is applied to a potentiometer from which a portion of the error voltage is used in order to control the sensitivity of the system. The selected portion of the error signal is then applied to one section of the twin triode tube which causes the output of one section to increase or decrease depending on the polarity of the input voltage. The other section of this twin triode tube is connected to the antihunt or negative feed back circuit. The antihunt voltage is proportional to the rate of change of motor field current or generator voltage (depending on the system used) resulting from the regulating action, and is in a direction to oppose any change in these quantities. The output of the two elements of this twin triode tube are approximately balanced when no error signal exists.

The second stage also includes a twin triode tube which further amplifies the output of the corresponding section of the first stage. Current limit control can be introduced in this stage. This may be accomplished by measuring the magnitude and polarity of armature current, amplifying this signal and feeding it into the input of the second stage. If the motor armature current exceeds a preset value, the current limit signal will predominate over the error and antihunt signals from the first stage thus limiting the regulator action.

The amplified output of each triode section of the second stage is connected in a bridge arrangement and the positive or negative difference is applied to the controlled rectifier.

The controlled rectifier shown in Figure 11 consists of three thyratrons, phase shift circuit and transformers. The phase shift circuit is designed to shift the voltage on the grids of the thyratrons 120 Fahr. lagging with respect to their anode voltages.

The d-c voltage from the amplifier is applied to the grids in series with the fixed phase shifted voltage. Variation of the d-c component of this grid voltage controls the output of the thyratrons over their full range from minimum to maximum. The three phase rectifier output is then applied to the field of the section motor or section generator depending on which system is used. The speed of the section motor is thus controlled by the output.

The decision to use a controlled rectifier for motor or generator field excitation rather than a rotating machine was based on the desire to eliminate all possible commutating machines with their attendant maintenance and inconsistencies from the regulating circuit. More important, perhaps, was the aim for the quickest possible regulator response.

Conclusions

The all-electronic regulating system has been applied to a number of machines producing widely different types of paper including tissue, book and kraft. Operating experience indicates that the over-all system design is sound. The use of an a-c speed

(Turn to page 122)

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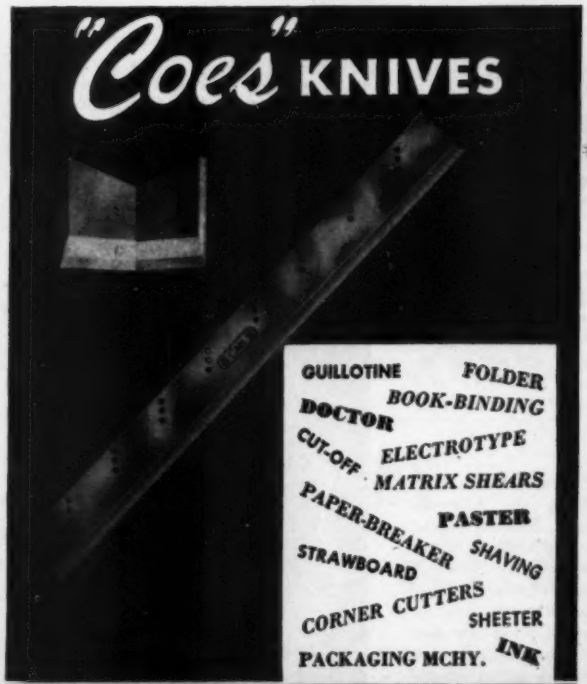

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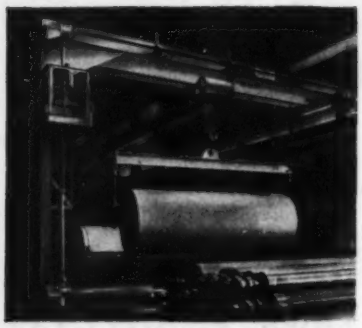
Overhead Crane

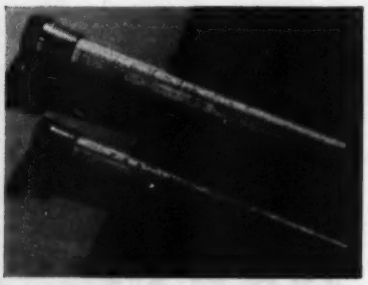
Single girder, motor driven overhead cranes, manufactured by Industrial Equipment Co., 343 North Ada Street, Chicago 7, Ill., are being introduced to the paper manufacturing industry. This equipment may be had in either top running or underhung type, both of which are of welded steel construction.



These cranes are built in various sizes, shapes and weights; each has its distinct application, depending upon cycle of operation, headroom conditions, available superstructure, etc. Push type crane systems, for example, are used over areas where the span, capacity, cycle of operation and height are relatively small. If, on the other hand, these factors are relatively large, a hand geared crane or a motor driven crane system is recommended, depending upon the cycle of operation and length of travel. Jib cranes also vary in capacity, span and type, and likewise can be used to increase efficiency. This crane usually is limited to applications where handling is confined to an area within a certain radius.

Zinc Plugs Inhibit Corrosion

To protect against corrosion, Rotometals Inc., 980 Harrison St., San Francisco 7, Calif., has developed *Cor-in* corrosion inhibitor zinc rods, which are fitted with standard pipe-plug ends, that screw easily into heat exchangers, piping and other



hydraulic equipment. The zinc rods come in ⅜ in, ½ in, ⅝ in, ¾ in and 1 in diameters, with lengths up to 12 inches.

Cor-ins are used as both new and replacement equipment for most makes of diesel engines, for refrigeration equipment, industrial radiators, water and oil coolers, heaters and other heat exchangers, as well as for all hydraulic units subject to corrosion.

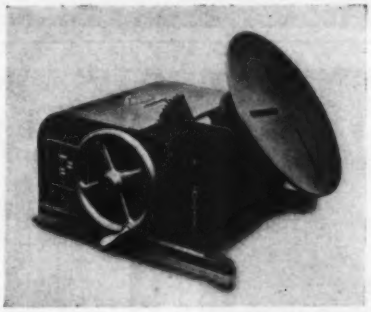
These zinc rods extend the protection of galvanizing, but they can be renewed readily by unscrewing the used-up zinc and screwing in a new one. These replaceable zinc rods thus keep on protecting equipment for years after galvanizing has eaten away.

The zinc rod used in Cor-ins has higher electro-chemical potential than the metals to be protected from corrosion. Thus oxygen or other corrosive causations consume the zinc in preference to the electro-chemically less active metals of which pipes, tanks, or other hydraulic equipment are made. Metals which are more reactive than the zinc must depend upon film formation to slow down their violent reactivity with water.

Work Positioner

A newly designed motor-operated work positioner, driven by a hydraulic variable speed transmission and a ½ hp single-phase ac motor, has been introduced by Ransome Machinery Co., subsidiary of Worthington Pump and Machinery Corp., Dunellen, N. J. The positioner, known as Model I-P, has a load capacity of 100 lb.

The table top rotates 360 degrees at variable speeds, adjustable from 0-5 rpm in either direction. It is manually tilted



through 135 degrees and locks at any degree of tilt by means of worm-and-segment.

The positioner is suited for such operations as welding, hard surfacing, assembling, repairing, grinding, and similar operations because it places the work in a position most convenient for the operator.

Wax Additive

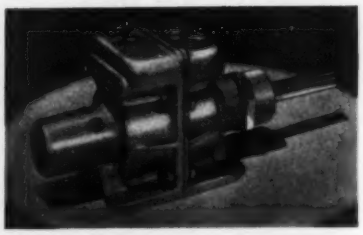
Three new types of *Arwax* concentrates have been announced by the American Resinous Chemicals Corp., Peabody, Mass. The new products are concentrates of either polyethylene, butyl rubber or S-polymer in paraffin or microcrystalline wax, and are stabilized against degradation by heat or oxidation. The addition of these new concentrates to the Arwax line broadens its property-improving qualities as an addend to paraffin for many industrial applications.

The polyethylene concentrates improve the grease-resistance and gloss of paraffin coatings while raising the block point. High and medium molecular weight, these concentrates increase tensile strength more than do any other type of Arwax.

Butyl rubber concentrates enable the wax compounder to improve tensile strength, increase flexibility and adhesion at a lower cost. Another advantage is lower viscosity at higher polymer concentrations. This allows greater ease of application.

Gearless Pump

A gearless pump for the handling of industrial liquids, has just been announced by Eco Engineering Company, 12 New York



Ave., Newark 1, N. J. The new *Eco* gearless pump includes several special features and improvements for the handling of a wide range of liquids and viscous fluids. Chief among the improvements is the new dual eccentric piston design which gives a strong flow against pressure.

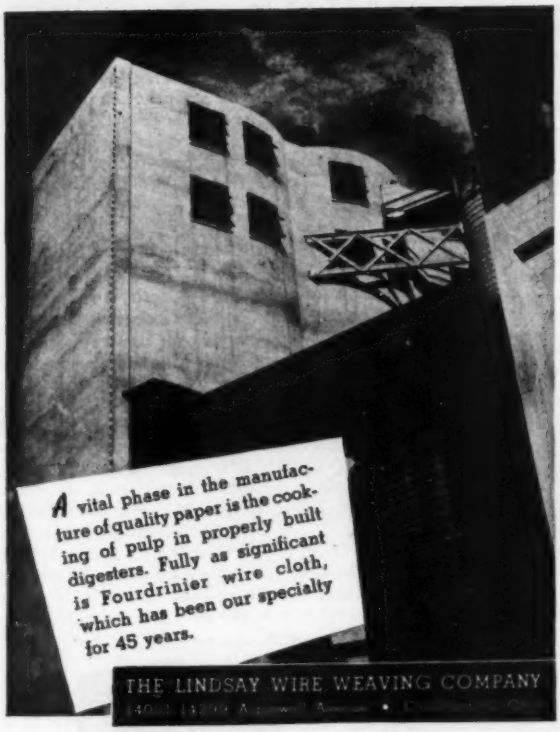
The pump body is of naval bronze forgings or stainless steel precision castings. Eccentric pistons are made of resilient compounds.

Available in four sizes, ¼ in, ⅜ in, ½ in and ¾ in, these pumps have capacities ranging from one to twelve gpm varying with pump speed. Pumps are available for use against pressures ranging from zero up to 100 lb per sq in. They can be run, and will deliver, at speeds from 200 to 2400 rpm.

Rubber Expansion Joints

Rubber expansion joints for pressure, vacuum or pressure and vacuum, have been developed by the Garlock Packing Company, Palmyra, N. Y. They are flexible, rubber

connections, installed in pipe lines for the purpose of relieving stress and strain in the piping and equipment. These joints were designed to compensate for linear expansion and contraction of the line due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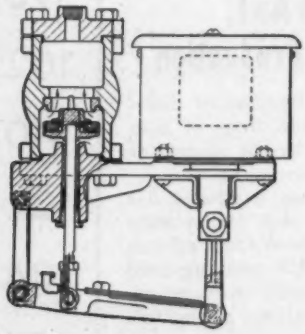
to temperature changes; they absorb vibration which is destructive to mechanical equipment; they reduce or eliminate the transmission of undesirable noise; and they compensate for minor misalignment in the piping.

They are spool-type joints made of a high-grade rubber compound combined with plies of sturdy cotton duck, and the body or carcass of the joint is further reinforced with steel wire or rings. Flexibility is provided by a central arch in the body of the joint located midway between the flanges. This arch flexes with expansion and contraction of the piping, thus absorbing stresses and strains in the line.

Safety Solenoid Valve

Designed to meet emergency or safety requirements, a 150-lb, globe-type solenois valve recently has been announced by the Johnson Corp., Three Rivers, Mich. Intended for service in which the valve is normally open, this series No. 6000 valve is capable of remaining closed for indefinite periods of time.

When an emergency arises, the control element immediately causes the solenoid to be energized, thus closing the valve instantly. Since the valve closes with the pressure and flow, it will remain closed as



long as a pressure above three pounds exists on the inlet side, and regardless of whether or not the solenoid continues to be energized.

To permit easy opening of the valve once the emergency has passed, a simple piping arrangement is utilized. A ⅛ in pipe, branching from the main inlet pipe, bypasses the inlet side of the valve and leads directly into the chamber on the outlet side. Flow through this pipe is controlled by a ⅛ in globe valve. Opening equalizes the pressure above and below the disc, thereby allowing the solenoid-controlled valve to open. The globe valve is then closed and is ready for the next emergency.

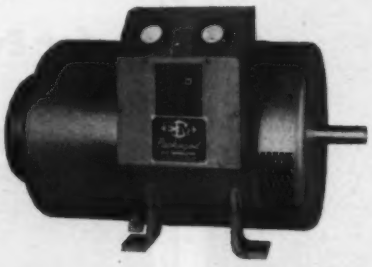
Chain Vise

Two new Baldwin-Rex chain vises have just been placed on the market by the Baldwin-Duckworth Division of Chain-Belt Company, Springfield, Mass. These vises simplify the process of taking roller chains apart. The forged steel jaws securely hold the chain while properly applied blows with an ordinary drift will quickly remove the pin. Each vise has the jaws so shaped that the pin link to be removed has a firm seating on the edges of the jaws.

Both vises are easily adjustable to fit chains within their range of sizes. Vise No. 1 will handle single width roller chains from ½ to 1-inch pitch and double width roller chains D-40 and D-50. Vise No. 2 will handle single width chains from 1 to 2-inch pitch and double widths chains from D-80 to D-150.

Packaged Generators

The packaged generator line announced by Electric Machinery Mfg. Co., Minneapolis 13, Minn., in December, 1947, featuring complete unit of generator, exciter and built-in voltage regulating circuit, is now



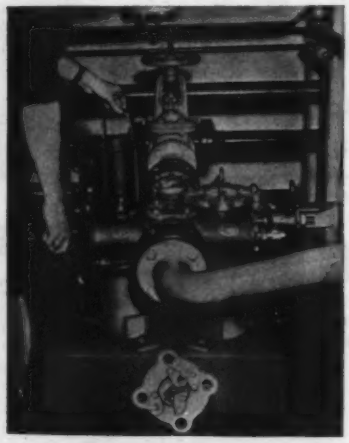
extended to include self-contained main generator switch on ratings up to 15 kw. No additional switches or controls are necessary; unit is connected direct to load.

Complete modern line features units in single and 3-phase ratings up to 150 kw at speeds 900 rpm to 1800 rpm.

Disc Type Duplex Strainer

A duplex strainer has been designed by the J. A. Zurn Mfg. Co., Erie, Pa., to handle fluids with a high solid content without the necessity of interrupting pipe line operation to clean the strainer. These uits are suitable for intermittent as well as continuous flow. Their flexibility of design permits the handling of sudden surges of solids.

Flow through the unit is diverted from one straining chamber to another by a large handwheel without the possibility of any positive shut-off. While flow passes through



one straining chamber, the other may be cleaned. Covers are removable for lifting out the perforated strainer baskets.

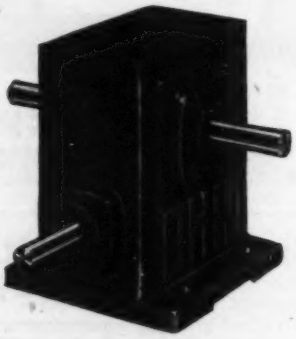
This strainer is adapted to high open area ratio and is suitable for a wide range of pressures and temperatures. Valve seats are removable and valve stems are supported at both ends for accurate permanent alignment. A large handhole above each valve assembly permits servicing the valves without removing the strainer from the line.

The strainer basket is set eccentrically, with respect to the basket chamber, so that the flow section is proportional to the flow needs at all points, thus minimizing pressure drop.

Single Reduction Speed Reducer

Announced by the Ohio Gear Co., 1384 E. 179th St., Cleveland 10, Ohio, is a new single reduction speed reducer in the "baby" size. The new unit, designated as BHS, is a right angle drive with input shaft below and the worm gear or output shaft above.

Over-all dimensions are: 4¾ in long, 3 in wide, and 6¼ in high. Ratios available range from 6-1 to 58-1, input hp is from ⅛ to ⅜ and output torque (1800 rpm input) ranges from 103 in lb to 168 in lb, depending on ratio. Input shaft diameter is ½ in with 1⅜ in extension; output shaft diameter is ⅜ in with 1-15/16 in extension. Housing is of aluminum alloy. Base is 5 in wide and 4¾ in long. Bolt hole centers are 2⅞ in in length by 4⅛ in in width.



Worm is of high grade carborized steel selected for its exceptional wearing qualities. The worm gear is made of special nickel bronze selected for maximum strength balanced with a minimum co-efficient of friction.

Paint Primer for Wet or Rusted Metal

Providing a hard, paintable foundation on metal for any type of paint (including ship-bottom paint) is a new combination chemical pretreatment and primer called *Rust-O-Primer*, manufactured by The Wilbur & Williams Company, Greenleaf and Leon Streets, Boston 15, Massachusetts. It has a vinyl base and is a quick-drying wet primer applicable over wet or dry, clean or rusted metal including steel, aluminum or galvanizing. This primer eliminates the necessity of having to remove rust or to have the surface dry before painting.

Ball Type Inner Valve

A ball type inner valve designed to give accurate regulation, greater capacity and tight closing is announced by Klipfel Manufacturing Co., Division of Hamilton-Thomas Corp., Hamilton, Ohio. The new ball inner valve construction appears in all valves of

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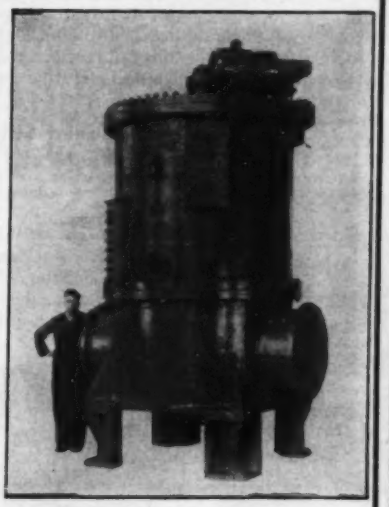

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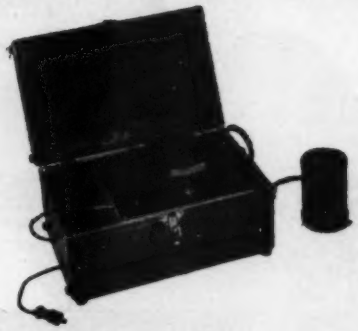

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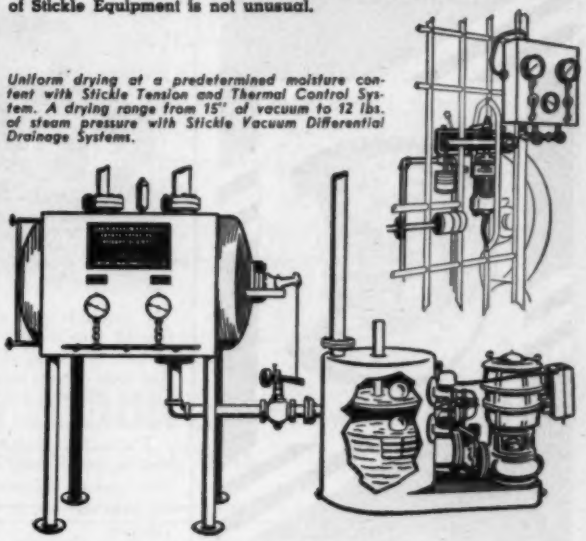

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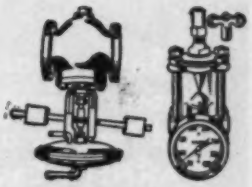
The Stickle Automatic Differential Valve controls exact differential in pressure between sections of paper machine for proper drainage at all pressures. The Stickle Micro Adjustable Orifice permits visible check on operation of individual dryers.



GET BULLETIN FOR COMPLETE DETAILS

Stickle systems provide advantages in addition to drainage and control effectiveness that improve efficiency and reduce cost. Stickle systems are composed of tried and tested equipment integrated and adapted to specific conditions of operation. The advantages a Stickle System may offer you will be explained without obligation. Ask for Bulletin No. 180 and 180-A.

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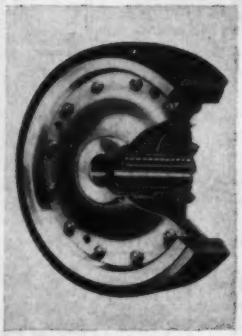

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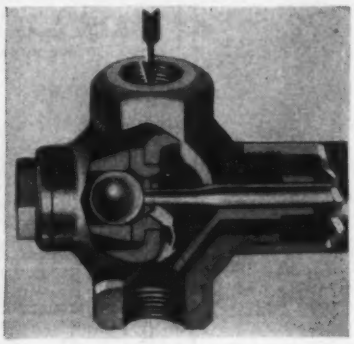
the Klipfel "400" series—for applications which require accurate regulation of steam, water, air or gas at inlet pressures less than 250 pounds, reduced pressures below 150 pounds, and where the reduced pressure must be adjusted frequently.

All valves of the "400" series are single seated with a ball inner valve actuated by a rubber diaphragm. The ball centers freely on the seat with uniform contact all around. Consequently the ball closes tight the moment it seats. When off the seat the ball is



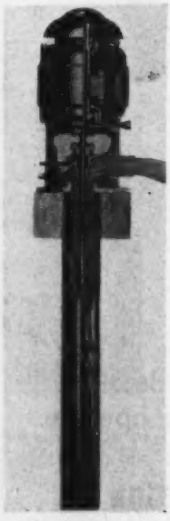
free to turn so that all parts are exposed in turn to the scouring action of the flow. Any wear which may occur in time will be evenly distributed so that the ball remains perfectly round and tight seating.

There is no danger of misalignment, distortion, or sticking with this construction. The smooth, stream-lined passage between the ball and seat bevel permits a high flow capacity.

Ball is of stainless steel, forged and heat treated for extreme hardness and accurately ground to perfect roundness. Seat also is of stainless steel but of a different analysis.

Turbine Pump for Small Deep Wells

A new turbine pump for small diameter deep wells which is capable of developing water capacities up to 5000 gph from depths as great as 200 feet, is announced by the Peerless Pump Division of the Food Machinery and Chemical Corp., 301 W. Avenue 26, Los Angeles 31, Calif. This new pump, designated as the *Peerless Champion*, fills the gap in water production from deep wells 4 inches in diameter and larger which is often found between "domestic" water water systems and the larger types of deepwell turbine pumps.



An open line shaft pump, bowl and shaft bearings are lubricated by the well's own water. No oil is used underground. Semi-open propellors, streamlined porcelain-enameled bowl sections, rubber bearings all contribute to its smooth water lifting with minimum losses due to turbulence. All shafting is stainless steel. Utilization of long cutless fluted rubber shaft bearings, spaced every five feet, are resistant to normal sand and abrasive conditions. Impellers are die-cast bronze, hand finished and balanced.

Redesigned Slitters and Winders

Complete redesign of its line of Type "DA" slitters and winders or Rewinders has been announced by Samuel M. Langston Company of Camden, New Jersey.

The adoption of completely enclosed gear drives for the main drive (Figure 1) and the pressure roll drive (Figure 2) con-

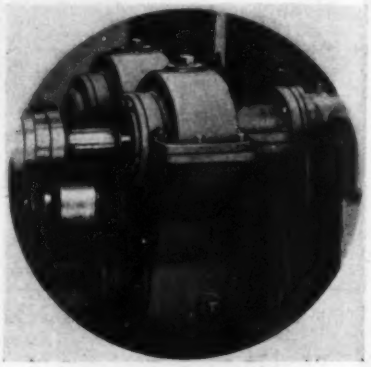


Figure 1

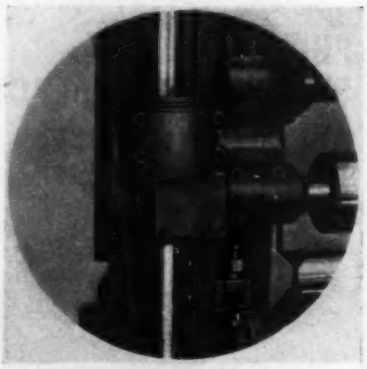


Figure 2

Figure 3

HOW TO REDUCE ACCIDENTS IN YOUR PLANT

The accident rates of National Safety Council Industrial Members are 30 to 40 per cent less than the rates of non-member companies. Yet, the cost of Council membership is frequently less than the cost of a single accident.

The 315 members of the Pulp and Paper Section cordially invite you to share the safety materials, services, information exchange, and activities which they have found so valuable in their efforts to prevent accidents to their employees.

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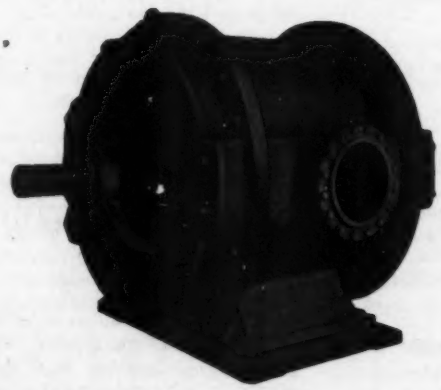

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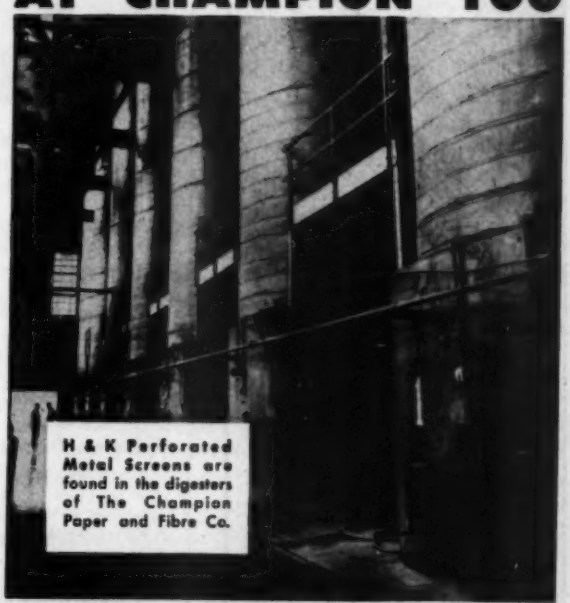

Digester Room of the Houston Division, Champion Paper & Fibre Co. (Champion Photo)

The Harrington & King PERFORATING Co.

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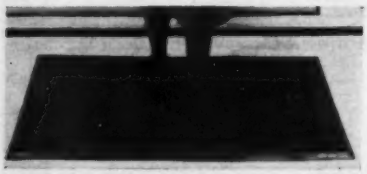
sisting of "nitrided" helical gears running in oil is one of the primary features of this slitter and winder. Appearance has been considered by the use of box-section frames and castings, which also contribute to ruggedness of construction.

The use of a newly-designed, frictionally-driven front slitter operating in conjunction with a power driven rear slitter, results in clean cut, dust-free rolls. Various types of drives are available, including direct connected variable speed motors, variable speed clutch pulleys, etc.

The machine illustrated (Figure 3) is a 120-in. wide machine capable of rewinding rolls up to 72 inches in diameter. Machines are built in any width from 82 in. up to 232 in. and wider, and to rewind diameters up to 72 in.

Sponge Rubber Mats and Runners

A new line of sponge rubber mats and runners is being produced at Atlas Sponge



Rubber Co., 806 East 61st Street, Los Angeles, California.

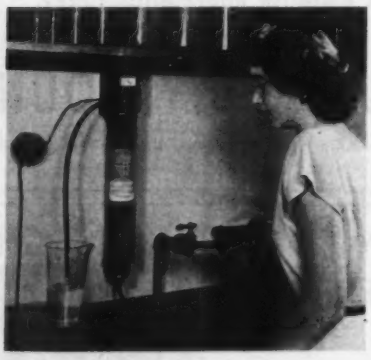
Standard mats are made of resilient sponge rubber ½ in. thick x 21½ in. x 47 in. and have beveled edges; also ½ in. x 21½ in. x 23 in.; available in black or green; other colors on special order. Runners are available in 47 in. units.

According to the manufacturer, sponge rubber mats are effective in increasing production as they prevent foot and leg strain of employees who stand on concrete or tile floors. Other advantages claimed are safety, a reduction in floor noise and breakage, in addition to increased employee efficiency and good will.

New Model Cartridge Demineralizer

Recently announced by the Ion Exchange Products Department of American Cyanamid Co., 30 Rockefeller Plaza, New York 20, N.Y., is a redesigned *Filt-R-Stil* cartridge demineralizer for delivering the low-cost chemical equivalent of distilled water, without heat at a maximum rate of 10 gph.

The new unit consists of three principal parts: a disposable cartridge containing Cyanamid's Ionac ion-exchange resins; a bracket or support for the cartridge; and an electrical conductivity indicator. The new wall model is light, simple in design and



compact. The conductivity indicator shows the quality of treated water continuously. The unit requires only two watts of electricity.

To install, the unit need only be fastened to a wall and the inlet tubing attached to a cold-water faucet. When the water is turned on, it flows through the cartridge and emerges essentially mineral-free. The water delivered by the cartridge unit is guaranteed to contain no more than 10 parts of dissolved ionized solids per million parts of water, exclusive of silica.

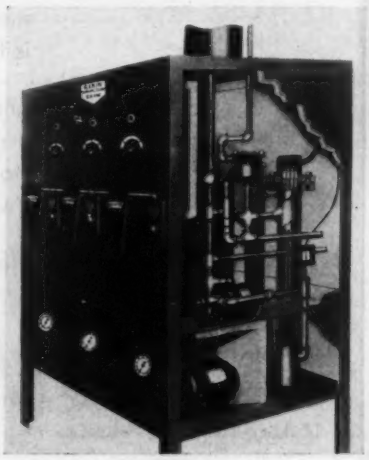
Extreme Pressure Lubricant

A new type dry lubricant, *Molykote*, available in 10-oz. shaker top cans, has been developed by the Alpha Corp., Greenwich, Conn. It consists essentially of molydenum disulphide powder and has the appearance of graphite, though it contains none.

Numerous tests have shown its extremely low friction co-efficient and a phenomenal capacity to prevent galling or seizing at bearing pressures well over 100,000 psi and at either high or low sliding velocities. Ten ounces will cover 500 ft. of smooth metal surface with a tenacious shiny coating. This suggests its use as a factory-applied lifetime lubricant for mechanical articles. It is equally suitable for high, low, or room temperatures. When used on screw fasteners or press fits, assembly takes place at a smoothly increasing torque or force without jerking.

Electric Heat Transfer System

Designed for use in coating paper and fabrics, a new electric heat transfer system has been developed by the Gerin Manufacturing Co., Inc., 683 Broadway, Newark 4, New Jersey. One of the features is a vapor release trap which continuously removes vapors formed as the oil passes over the heated surfaces, thus assuring that the entire heater surface will be oil covered at all times. This trap also eliminates water



often contained in fresh makeup oil, as well as any air entrained during filling.

This heater is capable of 600 degrees Fahr. temperatures, and improvements have been made which reduce vaporization and spot overheating. An expansion tank arrangement which prevents contact of hot oil with air lengthens the life of the oil.

Two safety features are dual temperature controls, and a heater shut-off which acts in case of low pump pressure.

▼

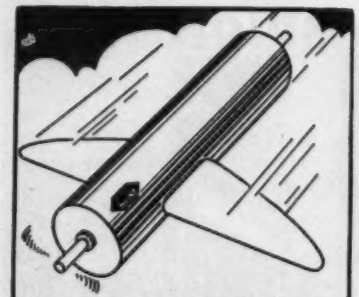
Electronic Speed Regulators . . .

(Continued from page 114)

cue permits isolation of circuits which are often troublesome. The electronic exciter for motor or generator excitation eliminates the necessity of a multiplicity of rotating units in the regulating system.

The sag-back problem is no longer a menace to successful operation of high speed kraft machines. Quick responding electronic regulators have measured up to the task.

As with all precision equipment, a carefully planned maintenance program is essential to the continued high-level performance of which these systems are capable. The most important part of such a program is periodic testing of all high vacuum tubes falling below these limits should be discarded. New tubes should be tested before they are installed. Records of tube characteristics as well as operating life and reason for replacement should be kept.



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"I took the Purchasing Agent into the mill"

"I had to show the Purchasing Agent how standardizing on Butterworth Calender Rolls would actually mean a saving in production costs. I showed him samples of calendering, better quality finishes, with only one Butterworth Roll in the stack and told him about the additional hours of service we got. He heard about our uniform production, fewer break-downs. This convinced him. Now we're buying Butterworth Rolls exclusively!"

Butterworth Calender Rolls give many additional hours of outstanding service because they are made to exact specifications, and are pretested for hardness, smoothness and density. Every Butterworth Roll is locked on the shaft under tremendous pressure.

In America's leading paper mills, Butterworth Calender Rolls are doing an outstanding job of delivering better finishes and giving long hours of service. No matter what your calendering needs are, and regardless of size, there is a Butterworth Calender Roll for every make calender. Furnished new or refilled. Write us today.

For full information, write or call H. W. Butterworth & Sons Company, Philadelphia 25, Penna.—Providence Division, Providence, R. I. : : Charlotte, N. C., 1211 Johnston Building In Canada—W. J. Westaway Company, Hamilton, Ontario

Butterworth Calender Rolls

New Catalogues and Publications

American Hoist & Derrick Co., St. Paul 1, Minn.—Now available from this company is its new 20-page catalogue covering 30-ton Diesel locomotive crane. Among the many illustrations is one of grapple work with pulpwood. Write the advertising department for Bulletin No. 600-L-6.

Bailey Meter Co., 1050 Ivanhoe Road, Cleveland 10, O.—Described in Bulletin No. 163-B, are the latest developments in the Multi-Pointer gages made by this company. Use of the diaphragm operated unit for measuring pressure, draft or differential is explained. There are numerous illustrations, including photos, diagrammatic drawings and cutaway drawings.

Bristol Co., Waterbury 91, Conn.—This company has announced the publication of Industry Data Bulletin 138, entitled, "Industrial Waste Disposal," in which is described the application of its automatic pH recording and controlling instruments and recording flowmeters to industrial waste disposal operations. Photos and diagrams are included.

Crane Co., 836 S. Michigan Ave., Chicago—Offered by this company is its new 32-page circular, No. 320, "Corrosion-Resistant Piping Materials." Descriptions and information on the complete line of valves, fittings, fabricated piping and pipe coils, are given; there are also eight pages of condensed recommendations, descriptions of alloy materials and a corrosion questionnaire.

Electric Steel Foundry Co., 2141 N. W. 25th Ave. Portland, Ore.—Descriptive of its new line of anticorrosion fittings, cast in Esco Alloy 20, is Bulletin 165A. Also available is Bulletin 166, listing the properties of Alloy 20.

Farrel-Birmingham Co., 344 Vulcan St., Buffalo 7, N. Y.—Just issued by this company is a new 44-page bulletin, containing complete information about its lines of speed reducers, which are now being offered. Directions for selecting speed reducers of the required speed and horsepower are given. Contents include descriptions of power transmission units of single and double reduction types, specifications, horsepower rating tables, overhung load capacities, dimensions and weights. Ask for Bulletin 449.

Foster-Wheeler Corp. 165 Broadway, New York 6, N. Y.—Featured in a brochure obtainable from this company are the design and service of four types of Karbate heat exchangers. Other applications of Karbate, such as an HCl absorber, an ejector for producing a high vacuum, and a standard heat exchanger for use in pilot plants and small volume processes are included. Also shown are the physical properties of Karbate, with a table giving its resistance to a large number of acids, salt solutions, alkalies, organic compounds, and gases and mixtures. There are numerous illustrations.

Graphite Metallizing Corp., 1050 Nepperhan Ave., Yonkers 3, N. Y.—The latest pamphlet, "Self-Lubricating Graphalloy Bushings," issued by this company describes its oilless bushings, used where usual forms of lubrication cannot be applied; at temperatures where oil solidifies or volatilizes, for current-carrying bearings; for bearings submerged in water, gasoline, weak acids and dye.

Industrial Equipment Co., 343 North Ada St., Chicago 7, Ill.—Now available from this company is their Catalogue No. MD-848, "Industrial Cranes, Single Girder, Motor Driven." Numerous photos are used to illustrate the construction details and applications of these cranes. Tables of dimensions and weights add to the value of the booklet.

Infilco, Inc., 325 W. 25th Place, Chicago 16.—An answer to the problem of elimination of white water pollution of streams to comply with state and federal requirements is the Cyclator developed by this company. It is described in Bulletin 850. Also available from this company is Bulletin 70, "Waste Treatment to Comply with Stream Pullution Regulations."

International Nickel Co., Inc., 67 Wall St., New York 5.—A booklet just published, "How To Get Longer Service From Your Pumps," may be obtained free of charge from this company. Four factors that affect pump life and performance are discussed in eight illustrated pages. These are corrosion, corrosion-fatigue, erosion and wear. Definite case histories are given.

Korb-Pettit Fabrics and Iron Works, Inc., 1505 N. Mascher St., Philadelphia 22, Pa.—Now available from this company is Handbook No. 36, containing 48 pages of specifications and illustrations of industrial wire cloth and woven wire screens.

Shartle Bros. Machine Co., Middletown, O. and **Dilts Machine Works**, Fulton, N. Y.—A new bulletin, 96-S, "Conveyors for Charging Hydrapulpers," has been issued by these companies. It is illustrated with numerous photos and diagrams, showing various types of conveyors used for delivering pulp or baled stock to Hydrapulpers. It may be obtained from either company.

Books

Acid Making in the Sulphite Pulp Industry—A series of previously published articles by A. H. Lundberg, West Coast representative of the G. D. Jenssen Company, Watertown, N. Y., presented in book form. It is profusely illustrated with charts, tables, graphs, figures, and flow sheets, completely indexed. The preparation of raw acid and cooking acid for sulphite pulp cooking is described. The information provides a comprehensive review of various process arrangements for acid preparation in the sulphite pulp industry. A bibliography is given.

One complimentary copy will be distributed to each of the sulphite pulp mills for their mill library. Additional copies may be obtained at $6.00 each by writing to the G. D. Jenssen Company, Inc., Electric Bldg., Watertown, N. Y.

The Chemistry and Utilization of Bark—Report of conference at Cambridge, Mass., September 17, 1948, held by Northeastern Wood Utilization Council in co-operation with the Massachusetts Institute of Technology. This bulletin summarizes present knowledge on bark chemistry and utilization, and suggests some of the further lines of research that are needed. Bark represents the greatest waste in industry, and the contents of this booklet explores the possibilities of profitable uses for this abundant organic material. The use of bark for deinking paper as developed in Europe is reported.

The price is $3.00, and it may be obtained by requesting Bulletin 25, Northeastern Wood Utilization Council, P. O. Box 1577, New Haven 6, Conn.

Newsprint Paper in North America—This work, by R. S. Kellogg, is a unique history and compilation of up-to-date statistical information on newsprint paper. The book is 8½ x 11 inches, printed on book paper and bound with flexible, fibreboard cover. There are 92 pages plus several fanfold charts.

The principal chapters cover the subjects: Definitions; Capacity; Newsprint Production; Newsprint Consumption; Newsprint Prices; Cost of Making Newsprint; Composition of Newsprint Paper; International Trade in Newsprint; Paper Mill Ownership; Where Wood and Water Meet; and World Distribution of Newsprint. The author is well-known for his long connection with the Newsprint Service Bureau. The information contained in this book has been made possible by his long personal study of newsprint manufacture and use and his research.

The price of the book is $15; it may be obtained from the Newsprint Service Bureau, 342 Madison Avenue, New York 17, N. Y.

Silicones and Other Organic Silicon Compounds—By Howard W. Post, professor of chemistry, University of Buffalo. Designed to be used both in lecture courses and for laboratory reference, the purpose of this book is to organize and correlate the great mass of material now in the chemical literature relating to silicone resins and other aspects of the organic chemistry of silicon. It contains what is claimed to be the first critical summary of the subject of silicone plastics, a most interesting development in the plastics field in recent years. A very thorough bibliography together with a detailed coverage of patent literature is included.

The price is $5.00 and may be obtained by addressing the publisher, Reinhold Publishing Corporation, 330 W. 42nd St., New York 18, N. Y.

Standards on Paper and Paper Products (with Related Information)—Prepared by American Society for Testing Materials Committee D-6, fourth edition (Dec., 1948). This booklet contains all of the 77 specifications and test methods on paper and paper products developed through the work of several technical committees of ASTM, particularly D-6 on Paper and Paper Products. Among the specifications are lime for cooking of rags in paper manufacture and waterproof paper for curing concrete. Some of the methods of test cover untreated paper used in electrical insulation; bulking thickness; machine direction; sampling; ash content; opacity; vibration test for shipping containers; and pressure sensitive adhesive tapes used in electrical insulation; and many others.

Copies of this 286 page book, paper covered, may be procured from American Society for Testing Materials Headquarters, 1916 Race St., Philadelphia 3, Pa., at $2.50 each.

Steel Plates and Their Fabrication—This book is published by Lukens Steel Company and its subsidiaries, By-Products Steel Corporation and Lukenweld, Inc., as an aid to engineers, designers and others who deal with steel plates and with structures of which they are a part. It was prepared under the supervision of Lionel S. Marks, professor emeritus of Harvard University, and editor of the "Mechanical Engineers' Handbook." This attractively bound volume contains extensive data for ready reference in selecting steel plates best suited to particular projects. There is a section of more than 100 pages of general engineering information, including mathematical tables, conversion tables, and other material of frequent reference, as well as much factual material on nickel-, stainless-, Inconel-, and Monel-clad steels, their physical and mechanical properties, and plate and head sizes. There is information also on the analyses of physical properties of carbon and low alloy steels with charts and tables showing their behavior under sustained and repeated loadings and their resistance to abrasion, corrosion, and temperatures.

The book is well illustrated with more than 300 charts, graphs, isometric, or other explanatory drawings. Engineers and designers desiring a copy should make their request on their company letterhead to Lukens Steel Company, 104 Highway Building, Coatesville, Pa. The price is $5.00.

Waste Trades Manual and Directory—First edition, published in London, and sponsored by The Waste Trade Federation, this is claimed to be the only directory and year-book of the world's waste material trade and reclamation industry. Its chief aim is to place on permanent record the achievements of the waste trade in all countries, and to provide a reliable and authoritative listing of firms in all branches of the world's waste trade. The waste paper industry, especially in Europe, is given a prominent place in the manual, with ten of its twenty odd chapters of particular interest to the paper industry.

Control of the trade and prices in the United Kingdom are covered, and brief histories are given of leading British and Dutch firms. A listing of organizations and trade associations all over the world from Sweden to the Argentine and from China to the United States are given.

Eleven firms from the United States are listed in the Waste Paper section of the Directory. A few advertisers from the U. S. A. are listed, but the bulk of those advertising are from the United Kingdom and Holland.

The price of the book is $5.00 post free, and may be obtained by addressing Mr. C. G. Hafley, Sales Director, British-Continental Trade Press Ltd., Suite 1508-A, 225 West 34th Street, New York, N. Y.

MEN WANTED—POSITIONS OPEN: We have inquiries for the following men—Carton estimator; assistant industrial relations director; boss machine tender (Fourdrinier), must be strong on colors; young chemist with technical education to work on carbon papers; chemist for paper board products, analysis and routine work; mechanical engineers; chief power plant engineers; machine tenders; back tenders.

Chemical salesman with or without previous sales experience. Salesman to sell paper to converters, bag manufacturers and food packers in New England territory.

We invite correspondence (confidential) with mills seeking executives and with executives seeking new positions.

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WANTED—Used English or Pope type reel, 86" to 110" face, in good condition. Address Box 482, Fritz Publications, Inc.

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ENGINEER WANTED

Experienced kraft pulp and paper mill engineer by a growing Southern mill. Excellent opportunity for a well qualified man that can express his ideas in the form of workable drawings. Give complete details in reply, including qualifications, experience, salary expected, etc. Address Box 483, Fritz Publications, Inc.

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NEW HIGH-PRECISION BAUER PULPER

End products now being produced from a wide range of materials after defiberization in Bauer disk pulpers.

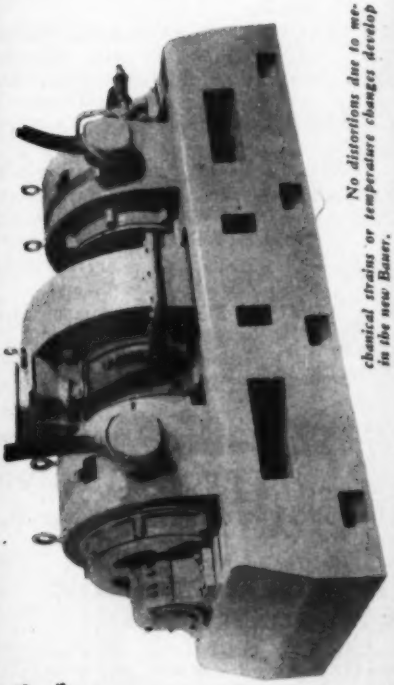
PRODUCTS HEREWITH — MATERIALS USED ON THE LEFT

- CONTAINER BOARD
- BOXBOARD
- WALL BOARD
- TISSUES
- TOWELING
- NEWSPRINT
- ROOFING FELT
- LINOLEUM FELT
- SPECIALTIES

FUNCTIONS:
- To disperse pitch and wood dirt
- On de-inking of old papers

So thorough, fast and economical is the action that more and more mills are installing Bauer's.

INVESTIGATE. PERHAPS YOU ALSO SHOULD BE USING BAUER PULPERS.



No distortions due to mechanical strains or temperature changes develop in the new Bauer.

MATERIALS
Groundwood screenings
Sulphite screenings
Kraft screenings
Steamed wood at atmospheric pressure
Steamed wood at elevated pressures
Semi-Chemical pulp
Waste paper
Straw pulp
Asplund fiber
Untreated (green) wood chips
Bagasse

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OFFERS SO MANY BIG ADVANTAGES?

● Prominent mills with a total production of thousands of tons of paper a day have found in the Glidden Prosize Process such a superior means of sizing, we are confident that you will want to try it soon. Specifically, on changing from conventional rosin size users have reported that:

—Prosize Process is 200 to 300% more efficient.

—Prosize Process produces a better, more stable size which gives paper uniform resistance to liquids of various types, such as ink, water, meat juices, etc.

—Prosize Process permits duplication of results from run to run on grades never before made because of sizing difficulties.

—Prosize Process minimizes seasonal variations—is highly effective on stocks heated by long beating or hard jordaning.

—Prosize Process permits sizing at a higher or more neutral pH.

—Prosize Process requires from 35 to 65% less rosin size and from 15 to 30% less alum, making it generally *less expensive* to use.

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5165 West Moffat St. • Chicago 39, Illinois

MORE ABOUT THE PROSIZE PROCESS IN THIS NEW, FREE BOOK!

Concise yet complete, profusely illustrated . . . this valuable new book on Industrial Soya Proteins gives you all the "whys" of the many advantages of the Prosize Process over conventional methods. Also has a chapter on Glidden Alpha* Protein, the pure protein chemically isolated from the soybean which forms the basic ingredient of the Prosize Process. Write for it today!

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MARKET QUOTATIONS

RAGS (Domestic)

NEW RAGS

Quotations to consuming mills, cents per pound or dollars per hundred pounds, f.o.b. New York, follow:

	per cwt.
Blue Overalls	7.00 to 7.50
Corduroy, Men's	5.75 to 6.00
Corduroy, Ladies'	5.75 to 6.00
Washables, No. 1	4.50 to 4.75
Percales	6.50 to 6.75
Light Prints, No. 1	6.25 to 6.50
Khaki Cuttings—	
Bleachable	6.25 to 6.50
Unbleachable	5.50 to 5.75
New White Canvas	11.50 to 12.00
New Mixed Blacks	5.25 to 5.50
Canton Flannels, Bleached	10.75 to 11.00
Shirt Cuttings—	
New White No. 1	10.75 to 11.00
White Shrunk	10.00 to 10.25
Silesias No. 1	8.50 to 8.75
New Unbleached	11.00 to 11.25
Fancy	6.00 to 6.25
Linen Cuttings—	
American	8.00 to 8.50
White	14.00 to 15.00
Grey	13.50 to 14.00

RAGS (Domestic)

OLD RAGS

Quotations to consuming mills, dollars per hundred pounds, f.o.b. New York, follow:

	per cwt.
Roofing—	
No. 1	1.25 to 1.30
No. 2	1.15 to 1.20
No. 3 and No. 4	.95 to 1.05
Twos and Blues—	
Repacked	3.00 to 3.25
Thirds and Blues—	
Repacked	2.85 to 3.00
Miscellaneous	2.25 to 2.50
Whites, No. 1—	
Repacked	4.75 to 5.00
Miscellaneous	4.00 to 4.25
White, No. 2—	
Repacked	3.50 to 3.75
Miscellaneous	2.75 to 3.00

RAGS (Foreign)

ex dock New York City

NEW RAGS

	per cwt.
New Dark Cuttings	Nominal
New Mixed Cuttings	
New Light Silesias	
Light Flannelettes	
Unbleached Cuttings	
New White Cuttings	
New Light Oxfords	
New Light Prints	

RAGS (Foreign)

ex dock New York City

OLD RAGS

	per cwt.
No. 1 White Linens	Nominal
No. 2 White Linens	
No. 3 White Linens	
No. 4 White Linens	
No. 1 White Cottons	
No. 2 White Cottons	
No. 3 White Cottons	
No. 4 White Cottons	
Extra Light Prints	
Ord. Light Prints	
Med. Light Prints	
Dutch Blue Cottons	
French Blue Cottons	
French Blue Linens	
Checks and Blues	
Linsey Garments	
Dark Cottons	
Old Shopperies	

ROPE and BAGGING

f.o.b. and ex dock New York City

	per cwt.
Gunny No. 1—	
Foreign	Nominal
Domestic	8.50 to 9.00
Wool Tares—	
Light	8.00 to 8.50
Heavy	8.50 to 9.00
No. 1 Scrap Bagging	6.50 to 7.00
Manila Rope—	
No. 1 large	6.00 to 6.25
No. 1 small	5.00 to 5.25
Sisal Rope—	
No. 1 large	5.00 to 5.75
No. 1 small	5.00 to 5.25
New Burlap Cuttings	8.50 to 9.00
Jute Threads—	
Foreign (Nom.)	6.50 to 7.00
Domestic	6.00 to 6.50
Strings—	
No. 1 sisal	5.00 to 5.25
No. 2 sisal	4.50 to 4.75
Soft jute	4.25 to 4.50
Mixed	2.50 to 2.75

WASTE PAPER

The following are quotations, dollars per ton, for No. 1 packing f.o.b. New York:

	per ton
Shavings—	
Hard White Env. Cuts.	95.00 to 100.00
Hard White, No. 1	80.00 to 85.00
Soft White No. 1	70.00 to 75.00
Soft White, one-cut	85.00 to 90.00
Soft White, Misc.	55.00 to 60.00
Fly Leaf, No. 1	30.00 to 35.00
Fly Leaf, Woody, No. 1	25.00 to 30.00
No. 2 Mixed Col. Woody	20.00 to 25.00
Flat Stock—	
No. 1 Heavy Books and Magazines	18.00 to 19.00
Mixed Books	13.00 to 14.00
Ledger Stock—	
No. 1 White	40.00 to 45.00
No. 1 Mixed (Colored)	30.00 to 35.00
Manilas—	
New Env. Cuttings	60.00 to 65.00
New Env. Cuts, One-Cut	—
Extra Manilas	—
Manila Tab Cards, Free of Ground Wood	70.00 to 75.00
Colored Manila Tab Cards	40.00 to 45.00
Kraft—	
New Envelope Cuttings	65.00 to 70.00
Tripled Sorted No. 1 100%	35.00 to 40.00
New 100% Cor. Cuts	35.00 to 40.00
No. 1 Old Assorted	25.00 to 30.00
News—	
White Blank	65.00 to 70.00
Overissue	17.00 to 18.00
No. 1 Baled	12.00 to 13.00
Old Corrugated Containers	13.00 to 14.00
New Jute Corrugated Cuts	20.00 to 21.00
Mill Wrappers	8.00 to 9.00
Box Board Chips	6.00 to 7.00
No. 1 Mixed Paper	6.00 to 7.00

CHEMICALS

f.o.b. shipping point

Alum (Papermakers)—	
Lump, cwt.	4.05—
Ground, cwt.	3.80—
Powdered, cwt.	4.20—
Blanc Fixe—	
Pulp, bulk, ton	77.50—
Dry, barrels	85.00—
Bleaching Powder—	
Drums, cwt.	4.25 to 4.50
Casein (Domestic Standard)	
20-30 mesh (bags), lb.	
80-100 mesh (bags), lb.	22.00 to 22.50
Argentine, lb.	22.00 to 23.00
China Clay—	
Domestic Filler Bulk (mine) ton	10.00 to 15.00
Domestic Coating Bulk (mine) ton	15.00 to 25.00
Imported (ship side) Bulk (lump) ton	22.00 to 30.00
Chlorine—	
Tank cars (wks) cwt.	2.40 to 2.70
Gelatine (silicin), lb.	1.25 to 1.35
Glyc. (C.P.) drums, lb.	.24½ to .25
Litharge, powd., bbl. lb.	.23 to .24
Rosin (Gum)—	
New York, per 100 lbs.	
E	6.70—
F	6.70—
G	6.70—
WWX	6.95—
Rosin (Wood), carlots	5.70—

MARKET QUOTATIONS

Salt Cake—	
Dom. bulk (wks) ton	26.00 to 28.00
Imp. bulks on dock— (Atl. ports) ton (Nom.)	27.00 to —
Soda Ash—	
Bulk (works), cwt.	1.10 to 1.20
Paper Bags, cwt.	1.30 to 1.40
Barrels, cwt.	1.70 to 1.80
Soda (Caustic)—	
Solid drums, cwt.	3.05 to 3.10
Ground and flake, drums, cwt.	3.45 to 3.50
Sodium Silicate—	
60 deg. 55 gal. drums, (works) cwt.	1.65 to 2.05
40 deg. 35 gal. drums, (works), cwt.	.80 to 1.45
Starch—	
Pearl, 140 lb. bags, cwt.	4.67—
Pearl, barrels, cwt.	4.67—
Paper, (Sp.) bags, cwt.	4.67—
Powdered, barrels, cwt.	4.78—
Sulphur (Crude) (Mine) bulk, long ton	16.00 to 18.00
Talc—	
Dom. 100 lb. bags (mine) ton	22.00 to 28.00
Canadian	35.00 to 45.00
Titanium Dioxide—	
Barium Pig. bbls., lb.	18 to .19½
Calcium Pig. bbls., lb.	18 to .19½
Zinc Sulphide, bbls., lb.	11.50 to 11.75

WOOD PULP

Prices, dollars per short, air dry, ton, on dock American ports and f.o.b. shipping points with former OPA freight allowances, are:

Bleached sulphite, Swedish	132.50—
Bleached sulphite, Finnish	132.50—
Bleached sulphite, dom.	126.00 to 130.00
Easy bleaching sulphite	—
Unbleached sulphite, Swed.	122.50 to 124.50
Unbleached sulphite, Fin.	122.50 to 126.50
Unbleached sulphite, dom.	118.00 to 125.00
Unbleached kraft, Swedish	112.50 to 117.00
Unbleached kraft, Finn.	112.50—
Unbleached kraft, northern	105.00 to 112.50
Unbleached kraft, southern	95.00 to 105.00
Bleached sulphate, Swedish	137.50 to 140.00
Bleached soda, domestic	125.00 to 130.00
Sulphite screenings, dom.	40.00 to 50.00
Sulphate screenings, dom.	40.00 to 50.00
Groundwood, domestic and Canadian	80.00 to 85.00

PAPER

f.o.b. New York City

Boards—	per ton
Binders	94.00—
Chip.	80.00—
Chip. tube and can	85.00—
Chip. full blending	87.50—
Chip. sgl. mla. lined	85.00—
Coated, white patent	
.016	120.00—
.020 and heavier	110.00—
Kraft liner	95.00 to 105.00
Filled News	82.50—
Container	90.00—

Book Papers—f.o.b. mill with quantity, weight, manufacturing and other differentials allowed:

(Per cwt. in ton lots)
Uncoated (Untrimmed)

Book, White (M. F.)—	
A Grade E. F.	14.40—
B Grade E.F.	14.40—
A Grade S. C.	15.90—
B Grade S. C.	14.80—
No. 2 Uncoated Offset 4 sides, White	—
Machine Coated White (Trimmed 4 sides)	
No. 1 Glossy	20.15—
No. 2 Glossy	18.90—
No. 3 Glossy	18.25—
No. 4 Glossy	—
No. 2 Offset	14.60—
C1S Litho (Varnish)	—
C1S Litho (Non-Varnish)	—

Writing Papers—f.o.b. mill with zone, quantity, packing and other differentials allowed:

Rag Content Bond— (In Ton Lots)	per cwt.
Extra 100% Rag	49.30—
100% Rag	42.70—
75% Rag	33.10—
50% Rag	27.60—
25% Rag	24.50—

Rag Content Ledger— (In Ton Lots)	per cwt.
Extra 100% Rag	50.50—
100% Rag	43.90—
75% Rag	34.30—
50% Rag	28.25—
25% Rag	25.70—

Sulphite Bond—	per cwt.
Air dry, watermarked	—
No. 1 watermarked	18.50—
No. 2 watermarked	17.55—
No. 4 watermarked	16.85—

Sulphite Ledger—	per cwt. Zone
No. 1 watermarked	18.85—
No. 2 watermarked	18.05—
No. 4 watermarked	17.35—

Glassine (f.o.b. mill)—	per cwt.
Embossed (25 lb. up)	—
Bleached (25 lb. up)	—
Unbleached (25 lb. up)	—
Greaseproof—	
Bleached (25 lb. up)	—
Unbleached (25 lb. up)	—

News—	per ton
Rolls, Standard Contract)	100.00 to 103.00
Rolls (Spot)	(Nominal)
Sheets	119.00—

Tissues (Carlots)—	per ream
White No. 1	1.85—
White No. 2	1.65—
Bleached Anti-Tarnish	—
Colored	—
Anti-Tarnish Kraft	1.75—
Manila	1.60—
Napkins, semi-crepe (12½ lb. to M shts.) per cs.	.80—
Napkins, full crepe and emb'sed (12½ lb. to M shts.) per cs.	.80—
Toilet, Bleached (M. shts.) per cs.	8.75 to 10.00
Toilet, Unbleached (M. shts.) per cs.	7.50 to 10.00

Towels—	per case
Bleached	4.75—
Unbleached	4.00—

Wrappings (Kraft)—	per cwt.
Super-Standard	9.00 to—
No. 1 Wrapping	7.50 to 8.00
Standard Wrapping	7.00 to 7.25
Standard Bag	6.50 to 7.00
Variety Bag	—

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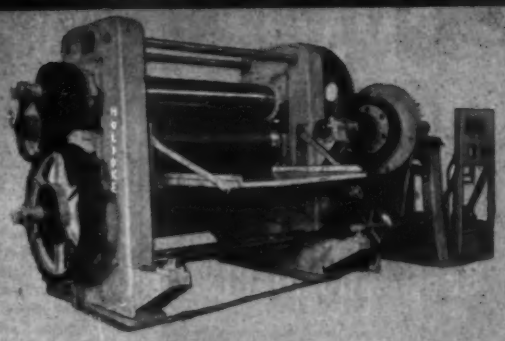

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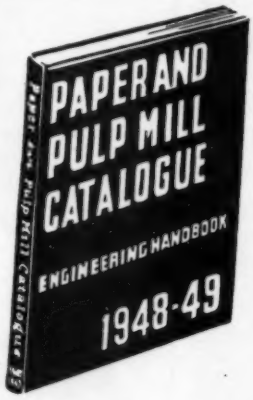

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